```
=> FILE HCAPLUS
FILE 'HCAPLUS' ENTERED AT 12:29:55 ON 13 MAY 2004
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PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
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FILE COVERS 1907 - 13 May 2004  VOL 140 ISS 20
FILE LAST UPDATED: 12 May 2004  (20040512/ED)

 This file contains CAS Registry Numbers for easy and accurate
 substance identification.


=> D QUE L61
L33          32 SEA FILE=REGISTRY ABB=ON  (9003-55-8/BI OR 112-02-7/BI OR
                12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B
                I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4
                /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR
                2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI
                 OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/
                BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B
                I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI
                OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)
L35           5 SEA FILE=REGISTRY ABB=ON  1318-93-0 OR 12172-85-9 OR 12173-47-6
                 OR 12286-87-2 OR 12424-32-7
L36           1 SEA FILE=REGISTRY ABB=ON  9003-55-8
L37          26 SEA FILE=REGISTRY ABB=ON  L33 NOT (L35 OR L36)
L38           5 SEA FILE=REGISTRY ABB=ON  L37 AND AMINIUM
L39           7 SEA FILE=REGISTRY ABB=ON  L37 AND AMMONIUM
L40          14 SEA FILE=REGISTRY ABB=ON  L37 AND 2/NC
L41          13 SEA FILE=REGISTRY ABB=ON  L40 NOT SAPONITE
L42          13 SEA FILE=REGISTRY ABB=ON  L38 OR L39 OR L41
L43      187947 SEA FILE=HCAPLUS ABB=ON  L35 OR CLAY# OR MONTMORILLONITE OR
                BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR
                SAPIOLITE OR BENTONITE
L44           1 SEA FILE=HCAPLUS ABB=ON  NONTRITE OR SOBOCKITE OR STERENSITE
                OR SINFORDITE
L45        7733 SEA FILE=HCAPLUS ABB=ON  (L43 OR L44) AND (SBR OR STYRENE(W)BUT
                ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)
L46         382 SEA FILE=HCAPLUS ABB=ON  L45 AND NANO?
L47      587060 SEA FILE=HCAPLUS ABB=ON  L42 OR CATION? OR QUAT?
L48          96 SEA FILE=HCAPLUS ABB=ON  L46 AND L47
L49          14 SEA FILE=HCAPLUS ABB=ON  L48 AND (NANOPARTICLE? OR PLATELET?
                OR PARTICLE?)
L51           3 SEA FILE=HCAPLUS ABB=ON  L49 AND RUBBER?/SC,SX
L52          88 SEA FILE=HCAPLUS ABB=ON  L48 AND (NANOPARTICLE? OR NANOCOMPOSIT
                ?)
```

```
L53          36 SEA FILE=HCAPLUS ABB=ON  L52 AND RUBBER?/SC,SX
L55           9 SEA FILE=HCAPLUS ABB=ON  L53 AND (AQ OR AQUEOUS OR H2O OR
                WATER?)
L56           5 SEA FILE=HCAPLUS ABB=ON  L53 AND LATEX
L58          64 SEA FILE=HCAPLUS ABB=ON  L48 AND POF/RL
L59          29 SEA FILE=HCAPLUS ABB=ON  L53 AND L58
L60          31 SEA FILE=HCAPLUS ABB=ON  L51 OR L55 OR L56 OR L59
L61          36 SEA FILE=HCAPLUS ABB=ON  L53 OR L60
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```
=> FILE WPIX
FILE 'WPIX' ENTERED AT 12:30:06 ON 13 MAY 2004
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FILE LAST UPDATED:            11 MAY 2004      <20040511/UP>
MOST RECENT DERWENT UPDATE:      200430         <200430/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> FOR A COPY OF THE DERWENT WORLD PATENTS INDEX STN USER GUIDE,
    PLEASE VISIT:
 http://www.stn-international.de/training_center/patents/stn_guide.pdf <<<

>>> FOR DETAILS OF THE PATENTS COVERED IN CURRENT UPDATES, SEE
    http://thomsonderwent.com/coverage/latestupdates/          <<<

>>> FOR INFORMATION ON ALL DERWENT WORLD PATENTS INDEX USER
    GUIDES, PLEASE VISIT:
    http://thomsonderwent.com/support/userguides/              <<<

>>> NEW! FAST-ALERTING ACCESS TO NEWLY-PUBLISHED PATENT
    DOCUMENTATION NOW AVAILABLE IN DERWENT WORLD PATENTS INDEX
    FIRST VIEW - FILE WPIFV. FREE CONNECT HOUR UNTIL 1 MAY 2004.
    FOR FURTHER DETAILS: http://www.thomsonderwent.com/dwpifv  <<<

>>> NEW! IMPROVE YOUR LITIGATION CHECKING AND INFRINGEMENT
    MONITORING WITH LITALERT. FIRST ACCESS TO RECORDS OF IP
    LAWSUITS FILED IN THE 94 US DISTRICT COURTS SINCE 1973.
    FOR FURTHER DETAILS:
    http://www.thomsonscientific.com/litalert          <<<

>>> THE DISPLAY LAYOUT HAS BEEN CHANGED TO ACCOMODATE THE
    NEW FORMAT GERMAN PATENT APPLICATION AND PUBLICATION
    NUMBERS. SEE ALSO:
    http://www.stn-international.de/archive/stnews/news0104.pdf <<<

>>> SINCE THE FILE HAD NOT BEEN UPDATED BETWEEN APRIL 12-16
    THERE WAS NO WEEKLY SDI RUN  <<<

=> D QUE L67
L33          32 SEA FILE=REGISTRY ABB=ON  (9003-55-8/BI OR 112-02-7/BI OR
                12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B
                I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4
                /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR
                2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI
                 OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/
                BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B
                I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI
                OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)
```

```
L35             5 SEA FILE=REGISTRY ABB=ON  1318-93-0 OR 12172-85-9 OR 12173-47-6
                   OR 12286-87-2 OR 12424-32-7
L36             1 SEA FILE=REGISTRY ABB=ON  9003-55-8
L37            26 SEA FILE=REGISTRY ABB=ON  L33 NOT (L35 OR L36)
L38             5 SEA FILE=REGISTRY ABB=ON  L37 AND AMINIUM
L39             7 SEA FILE=REGISTRY ABB=ON  L37 AND AMMONIUM
L40            14 SEA FILE=REGISTRY ABB=ON  L37 AND 2/NC
L41            13 SEA FILE=REGISTRY ABB=ON  L40 NOT SAPONITE
L42            13 SEA FILE=REGISTRY ABB=ON  L38 OR L39 OR L41
L43        187947 SEA FILE=HCAPLUS ABB=ON  L35 OR CLAY# OR MONTMORILLONITE OR
                  BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR
                  SAPIOLITE OR BENTONITE
L44             1 SEA FILE=HCAPLUS ABB=ON  NONTRITE OR SOBOCKITE OR STERENSITE
                  OR SINFORDITE
L45          7733 SEA FILE=HCAPLUS ABB=ON  (L43 OR L44) AND (SBR OR STYRENE(W)BUT
                  ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)
L46           382 SEA FILE=HCAPLUS ABB=ON  L45 AND NANO?
L47        587060 SEA FILE=HCAPLUS ABB=ON  L42 OR CATION? OR QUAT?
L63            32 SEA FILE=WPIX ABB=ON  L46 AND L47
L64            30 SEA FILE=WPIX ABB=ON  L63 AND C08?/IC
L65            13 SEA FILE=WPIX ABB=ON  L64 AND (PARTICLE? OR NANOPARTICLE? OR
                  AQ OR AQUEOUS OR H2O OR WATER? OR LATEX)
L66             5 SEA FILE=WPIX ABB=ON  L63 AND (TIRE# OR TYRE#)
L67            15 SEA FILE=WPIX ABB=ON  L65 OR L66


=> FILE JICST
FILE 'JICST-EPLUS' ENTERED AT 12:30:21 ON 13 MAY 2004
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FILE COVERS 1985 TO 10 MAY 2004 (20040510/ED)

THE JICST-EPLUS FILE HAS BEEN RELOADED TO REFLECT THE 1999 CONTROLLED
TERM (/CT) THESAURUS RELOAD.

=> D QUE L73
L33            32 SEA FILE=REGISTRY ABB=ON  (9003-55-8/BI OR 112-02-7/BI OR
                  12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B
                  I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4
                  /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR
                  2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI
                   OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/
                  BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B
                  I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI
                  OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)
```


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L35             5 SEA FILE=REGISTRY ABB=ON  1318-93-0 OR 12172-85-9 OR 12173-47-6
                   OR 12286-87-2 OR 12424-32-7
L36             1 SEA FILE=REGISTRY ABB=ON  9003-55-8
L37            26 SEA FILE=REGISTRY ABB=ON  L33 NOT (L35 OR L36)
L38             5 SEA FILE=REGISTRY ABB=ON  L37 AND AMINIUM
L39             7 SEA FILE=REGISTRY ABB=ON  L37 AND AMMONIUM
L40            14 SEA FILE=REGISTRY ABB=ON  L37 AND 2/NC
L41            13 SEA FILE=REGISTRY ABB=ON  L40 NOT SAPONITE
L42            13 SEA FILE=REGISTRY ABB=ON  L38 OR L39 OR L41
L43        187947 SEA FILE=HCAPLUS ABB=ON  L35 OR CLAY# OR MONTMORILLONITE OR
                  BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR
                  SAPIOLITE OR BENTONITE
L44             1 SEA FILE=HCAPLUS ABB=ON  NONTRITE OR SOBOCKITE OR STERENSITE
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```
                OR SINFORDITE
L45        7733 SEA FILE=HCAPLUS ABB=ON  (L43 OR L44) AND (SBR OR STYRENE(W)BUT
                ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)
L46         382 SEA FILE=HCAPLUS ABB=ON  L45 AND NANO?
L47      587060 SEA FILE=HCAPLUS ABB=ON  L42 OR CATION? OR QUAT?
L73           1 SEA FILE=JICST-EPLUS ABB=ON  L46 AND L47
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```
=> FILE RAPRA
FILE 'RAPRA' ENTERED AT 12:30:33 ON 13 MAY 2004
COPYRIGHT (C) 2004 RAPRA Technology Ltd.

FILE LAST UPDATED: 26 APR 2004       <20040426/UP>
FILE COVERS 1972 TO DATE

>>> Simultaneous left and right truncation is available in the
    basic index (/BI), and in the controlled term (/CT),
    geographical term (/GT), and non-polymer term (/NPT) fields. <<<

>>> New search field /AB is available <<<

>>> The RAPRA Classification Code is available as a PDF file
>>> and may be downloaded free-of-charge from:
>>> http://www.stn-international.de/stndatabases/details/rapra_classcodes.pdf

>>> New monthly SDI Alert availability --> see NEWS  <<<

=> D QUE L71
L33          32 SEA FILE=REGISTRY ABB=ON  (9003-55-8/BI OR 112-02-7/BI OR
                12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B
                I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4
                /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR
                2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI
                 OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/
                BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B
                I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI
                OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)
L35           5 SEA FILE=REGISTRY ABB=ON  1318-93-0 OR 12172-85-9 OR 12173-47-6
                 OR 12286-87-2 OR 12424-32-7
L36           1 SEA FILE=REGISTRY ABB=ON  9003-55-8
L37          26 SEA FILE=REGISTRY ABB=ON  L33 NOT (L35 OR L36)
L38           5 SEA FILE=REGISTRY ABB=ON  L37 AND AMINIUM
L39           7 SEA FILE=REGISTRY ABB=ON  L37 AND AMMONIUM
L40          14 SEA FILE=REGISTRY ABB=ON  L37 AND 2/NC
L41          13 SEA FILE=REGISTRY ABB=ON  L40 NOT SAPONITE
L42          13 SEA FILE=REGISTRY ABB=ON  L38 OR L39 OR L41
L43      187947 SEA FILE=HCAPLUS ABB=ON  L35 OR CLAY# OR MONTMORILLONITE OR
                BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR
                SAPIOLITE OR BENTONITE
L44           1 SEA FILE=HCAPLUS ABB=ON  NONTRITE OR SOBOCKITE OR STERENSITE
                OR SINFORDITE
L45        7733 SEA FILE=HCAPLUS ABB=ON  (L43 OR L44) AND (SBR OR STYRENE(W)BUT
                ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)
L46         382 SEA FILE=HCAPLUS ABB=ON  L45 AND NANO?
L47      587060 SEA FILE=HCAPLUS ABB=ON  L42 OR CATION? OR QUAT?
L68          14 SEA FILE=RAPRA ABB=ON  L46 AND L47
L69           1 SEA FILE=RAPRA ABB=ON  L68 AND (TIRE# OR TYRE#)
L70           4 SEA FILE=RAPRA ABB=ON  L68 AND (PARTICLE? OR NANOPARTICLE? OR
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                AQ OR AQUEOUS OR H2O OR WATER? OR LATEX)
L71           5 SEA FILE=RAPRA ABB=ON  L69 OR L70
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```
=> FILE JAPIO
FILE 'JAPIO' ENTERED AT 12:30:45 ON 13 MAY 2004
COPYRIGHT (C) 2004 Japanese Patent Office (JPO)- JAPIO

FILE LAST UPDATED: 8 APR 2004          <20040408/UP>
FILE COVERS APR 1973 TO DECEMBER 05, 2003

<<< GRAPHIC IMAGES AVAILABLE >>>

=> D QUE L74
L33          32 SEA FILE=REGISTRY ABB=ON  (9003-55-8/BI OR 112-02-7/BI OR
                12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B
                I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4
                /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR
                2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI
                 OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/
                BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B
                I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI
                OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)
L35           5 SEA FILE=REGISTRY ABB=ON  1318-93-0 OR 12172-85-9 OR 12173-47-6
                 OR 12286-87-2 OR 12424-32-7
L36           1 SEA FILE=REGISTRY ABB=ON  9003-55-8
L37          26 SEA FILE=REGISTRY ABB=ON  L33 NOT (L35 OR L36)
L38           5 SEA FILE=REGISTRY ABB=ON  L37 AND AMINIUM
L39           7 SEA FILE=REGISTRY ABB=ON  L37 AND AMMONIUM
L40          14 SEA FILE=REGISTRY ABB=ON  L37 AND 2/NC
L41          13 SEA FILE=REGISTRY ABB=ON  L40 NOT SAPONITE
L42          13 SEA FILE=REGISTRY ABB=ON  L38 OR L39 OR L41
L43      187947 SEA FILE=HCAPLUS ABB=ON  L35 OR CLAY# OR MONTMORILLONITE OR
                BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR
                SAPIOLITE OR BENTONITE
L44           1 SEA FILE=HCAPLUS ABB=ON  NONTRITE OR SOBOCKITE OR STERENSITE
                OR SINFORDITE
L45        7733 SEA FILE=HCAPLUS ABB=ON  (L43 OR L44) AND (SBR OR STYRENE(W)BUT
                ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)
L46         382 SEA FILE=HCAPLUS ABB=ON  L45 AND NANO?
L47      587060 SEA FILE=HCAPLUS ABB=ON  L42 OR CATION? OR QUAT?
L63          32 SEA FILE=WPIX ABB=ON  L46 AND L47
L74           2 SEA FILE=JAPIO ABB=ON  L63 AND C08?/IC
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=> FILE COMPENDEX
FILE 'COMPENDEX' ENTERED AT 12:31:00 ON 13 MAY 2004
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FILE LAST UPDATED: 10 MAY 2004          <20040510/UP>
FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> D QUE L72
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L33           32 SEA FILE=REGISTRY ABB=ON  (9003-55-8/BI OR 112-02-7/BI OR
                 12172-85-9/BI OR 12173-47-6/BI OR 12286-87-2/BI OR 12424-32-7/B
                 I OR 1318-93-0/BI OR 1319-41-1/BI OR 1337-81-1/BI OR 14314-78-4
                 /BI OR 185144-29-0/BI OR 188437-43-6/BI OR 2039-80-7/BI OR
                 2155-94-4/BI OR 25103-58-6/BI OR 26762-93-6/BI OR 27776-21-2/BI
                  OR 2867-47-2/BI OR 29383-23-1/BI OR 2997-92-4/BI OR 5339-11-7/
                 BI OR 57-09-0/BI OR 7720-78-7/BI OR 7727-21-1/BI OR 7727-54-0/B
                 I OR 78-67-1/BI OR 79-10-7/BI OR 79-41-4/BI OR 84092-72-8/BI
                 OR 94-36-0/BI OR 94291-22-2/BI OR 96536-37-7/BI)
L35            5 SEA FILE=REGISTRY ABB=ON  1318-93-0 OR 12172-85-9 OR 12173-47-6
                  OR 12286-87-2 OR 12424-32-7
L36            1 SEA FILE=REGISTRY ABB=ON  9003-55-8
L37           26 SEA FILE=REGISTRY ABB=ON  L33 NOT (L35 OR L36)
L38            5 SEA FILE=REGISTRY ABB=ON  L37 AND AMINIUM
L39            7 SEA FILE=REGISTRY ABB=ON  L37 AND AMMONIUM
L40           14 SEA FILE=REGISTRY ABB=ON  L37 AND 2/NC
L41           13 SEA FILE=REGISTRY ABB=ON  L40 NOT SAPONITE
L42           13 SEA FILE=REGISTRY ABB=ON  L38 OR L39 OR L41
L43       187947 SEA FILE=HCAPLUS ABB=ON  L35 OR CLAY# OR MONTMORILLONITE OR
                 BEIDELLITE OR HECTORITE OR VOLKONSKOITE OR SAUCONITE OR
                 SAPIOLITE OR BENTONITE
L44            1 SEA FILE=HCAPLUS ABB=ON  NONTRITE OR SOBOCKITE OR STERENSITE
                 OR SINFORDITE
L45         7733 SEA FILE=HCAPLUS ABB=ON  (L43 OR L44) AND (SBR OR STYRENE(W)BUT
                 ADIENE OR L36 OR RUBBER# OR ELASTOMER? OR LATEX)
L46          382 SEA FILE=HCAPLUS ABB=ON  L45 AND NANO?
L47       587060 SEA FILE=HCAPLUS ABB=ON  L42 OR CATION? OR QUAT?
L72            9 SEA FILE=COMPENDEX ABB=ON  L46 AND L47

=> DUP REM L61 L67 L73 L71 L74 L72
FILE 'HCAPLUS' ENTERED AT 12:31:41 ON 13 MAY 2004
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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FILE 'WPIX' ENTERED AT 12:31:41 ON 13 MAY 2004
COPYRIGHT (C) 2004 THOMSON DERWENT

FILE 'JICST-EPLUS' ENTERED AT 12:31:41 ON 13 MAY 2004
COPYRIGHT (C) 2004 Japan Science and Technology Agency (JST)

FILE 'RAPRA' ENTERED AT 12:31:41 ON 13 MAY 2004
COPYRIGHT (C) 2004 RAPRA Technology Ltd.

FILE 'JAPIO' ENTERED AT 12:31:41 ON 13 MAY 2004
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FILE 'COMPENDEX' ENTERED AT 12:31:41 ON 13 MAY 2004
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PROCESSING COMPLETED FOR L61
PROCESSING COMPLETED FOR L67
PROCESSING COMPLETED FOR L73
PROCESSING COMPLETED FOR L71
PROCESSING COMPLETED FOR L74
PROCESSING COMPLETED FOR L72
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L75   59 DUP REM L61 L67 L73 L71 L74 L72 (9 DUPLICATES REMOVED)

=> D ALL L75 1-59

L75 ANSWER 1 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2004:41549 HCAPLUS
DN 140:95433
ED Entered STN: 18 Jan 2004
TI Functionalized **elastomer nanocomposites** with improved air barrier properties for tire innerliners and innertubes
IN Gong, Caiguo; Dias, Anthony J.; Tsou, Andy H.; Poole, Beverly J.; Karp, Kriss R.
PA Exxonmobil Chemical Patents Inc., USA
SO PCT Int. Appl., 49 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08K003-34
ICS C08L051-00
CC 39-13 (Synthetic Elastomers and Natural **Rubber**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004005387	A1	20040115	WO 2003-US16944	20030530

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2002-394098P P 20020705
AB Title **nanocomposite** comprises a **clay** and an **elastomer** comprising at least C2-C10 olefin derived units; wherein the **elastomer** also comprises functionalized monomer units pendant to the **elastomer**. The **elastomer** include poly(isobutylene-co-p-alkylstyrene) **elastomers** and poly(isobutylene-co-isoprene) **elastomers**, which are functionalized via Friedel-Crafts reaction with a Lewis acid and a functionalizing agent such as acid anhydrides and/or acylhalides. The **clay** is exfoliated in one embodiment by the addition of exfoliating agents such as alkyl amines and silanes to the **clay**. The composition can include secondary **rubbers** such as general purpose **rubbers**, and curatives, fillers, and the like. Thus, a composition contains Cloisite 6A (**montmorillonite clays** treated with di-Me dihydrogenated tallow alkyl ammonium chloride) and succinic anhydride-modified XP 50 (isobutylene-methylstyrene **rubber**) in dichloromethane.
ST functionalized **elastomer nanocomposite** tire innerliner innertube **clay**
IT Synthetic **rubber**, uses
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(butadiene-isoprene-styrene; production of functionalized **elastomer**

nanocomposites containing **clay** for tire innerliners and innertubes)
IT Synthetic **rubber,** uses
RL: **POF (Polymer in formulation);** TEM (Technical or engineered material use); USES (Uses)
(butadiene-isoprene; production of functionalized **elastomer** **nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Amines, uses
RL: MOA (Modifier or additive use); USES (Uses)
(diamines, vulcanization agents; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Synthetic **rubber,** uses
RL: **POF (Polymer in formulation);** TEM (Technical or engineered material use); USES (Uses)
(ethylene-propene-styrene; production of functionalized **elastomer** **nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Amines, miscellaneous
Phosphines
Quaternary ammonium compounds, miscellaneous
Sulfides, miscellaneous
RL: MSC (Miscellaneous)
(exfoliating agent for **clay;** production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Carbon black, uses
RL: MOA (Modifier or additive use); USES (Uses)
(filler; production of functionalized **elastomer** **nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Tallow
RL: MSC (Miscellaneous)
(hydrogenated, di-Me, alkyl ammonium chloride, exfoliating agent for **clay;** production of functionalized **elastomer** **nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Tires
(inner tubes; production of functionalized **elastomer** **nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Synthetic **rubber,** uses
RL: **POF (Polymer in formulation);** TEM (Technical or engineered material use); USES (Uses)
(isobutylene-methylstyrene, brominated, XP 50; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)
IT Synthetic **rubber,** uses
RL: **POF (Polymer in formulation);** TEM (Technical or engineered material use); USES (Uses)
(isobutylene-methylstyrene; production of functionalized **elastomer** **nanocomposites** containing **clay** for tire innerliners and innertubes)
IT **Clays,** uses
RL: MOA (Modifier or additive use); USES (Uses)
(montmorillonitic, treated with di-Me dihydrogenated tallow alkyl ammonium chloride; production of functionalized **elastomer**

nanocomposites containing **clay** for tire innerliners and
innertubes)
IT Amines, miscellaneous
RL: MSC (Miscellaneous)
(primary, exfoliating agent for **clay;** production of
functionalized **elastomer nanocomposites** containing
clay for tire innerliners and innertubes)
IT Fillers
Nanocomposites
Tires
Vulcanization accelerators and agents
(production of functionalized **elastomer nanocomposites**
containing **clay** for tire innerliners and innertubes)
IT **Clays,** uses
RL: MOA (Modifier or additive use); USES (Uses)
(production of functionalized **elastomer nanocomposites**
containing **clay** for tire innerliners and innertubes)
IT Butadiene **rubber,** uses
Butyl **rubber,** uses
Natural **rubber,** uses
Styrene-butadiene rubber, uses
RL: **POF (Polymer in formulation);** TEM (Technical or engineered
material use); USES (Uses)
(production of functionalized **elastomer nanocomposites**
containing **clay** for tire innerliners and innertubes)
IT Amines, miscellaneous
RL: MSC (Miscellaneous)
(secondary, exfoliating agent for **clay;** production of
functionalized **elastomer nanocomposites** containing
clay for tire innerliners and innertubes)
IT Isobutylene **rubber**
RL: **POF (Polymer in formulation);** TEM (Technical or engineered
material use); USES (Uses)
(star-branched; production of functionalized **elastomer**
nanocomposites containing **clay** for tire innerliners and
innertubes)
IT Amines, miscellaneous
RL: MSC (Miscellaneous)
(tertiary, exfoliating agent for **clay;** production of
functionalized **elastomer nanocomposites** containing
clay for tire innerliners and innertubes)
IT Epoxides
Epoxy resins, uses
Fatty acids, uses
Polyamines
RL: MOA (Modifier or additive use); USES (Uses)
(vulcanization agents; production of functionalized **elastomer**
nanocomposites containing **clay** for tire innerliners and
innertubes)
IT 9003-17-2
RL: **POF (Polymer in formulation);** TEM (Technical or engineered
material use); USES (Uses)
(butadiene **rubber,** production of functionalized **elastomer**
nanocomposites containing **clay** for tire innerliners and
innertubes)
IT 9010-85-9
RL: **POF (Polymer in formulation);** TEM (Technical or engineered
material use); USES (Uses)

(butyl **rubber**, production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 75-09-2, Dichloromethane, uses 75-15-0, Carbon disulfide, uses 98-95-3, Nitrobenzene, uses 107-06-2, 1,2-Dichloroethane, uses 110-54-3, Hexane, uses 110-82-7, Cyclohexane, uses
RL: NUU (Other use, unclassified); USES (Uses)
(diluent; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 16749-13-6, Phosphonium 18155-21-0, Sulfonium
RL: MSC (Miscellaneous)
(exfoliating agent for **clay**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 7631-86-9, Silica, uses
RL: MOA (Modifier or additive use); USES (Uses)
(filler; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 85-44-9, Phthalic anhydride 88-95-9, Phthaloyl dichloride 99-63-8, Isophthaloyl chloride 100-20-9, Terephthaloyl dichloride 108-30-5, Succinic anhydride, uses 108-31-6, Maleic anhydride, uses 108-55-4, Glutaric anhydride 111-19-3, Sebacoyl chloride 111-50-2, Adipoyl chloride 123-98-8, Azelaoyl chloride 142-79-0, Pimeloyl chloride 543-20-4, Succinyl chloride 616-02-4, Citraconic anhydride 1663-67-8, Malonyl chloride 1931-60-8 2170-03-8, Itaconic anhydride 2873-74-7, Glutaryl chloride 10027-07-3, Suberoyl chloride 44987-62-4, 3-Methyladipoyl chloride 54505-72-5, Diethylmalonyl chloride
RL: MOA (Modifier or additive use); USES (Uses)
(functionalizing agents; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 7446-70-0, Aluminum trichloride, uses
RL: CAT (Catalyst use); USES (Uses)
(grafting promotor; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 9003-27-4
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(isobutylene **rubber**, star-branched; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 252254-69-6, Cloisite 6A
RL: MOA (Modifier or additive use); USES (Uses)
(production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT 25102-52-7, Butadiene-isoprene copolymer 25608-79-1, Ethylene-propene-styrene copolymer 26602-62-0, Butadiene-isoprene-styrene copolymer
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(**rubber**; production of functionalized **elastomer nanocomposites** containing **clay** for tire innerliners and innertubes)

IT **9003-55-8**
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered

    material use); USES (Uses)
       (**styrene-butadiene rubber**, production of
       functionalized **elastomer nanocomposites** containing
       clay for tire innerliners and innertubes)
T   **1318-93-0, Montmorillonite**, uses
    RL: MOA (Modifier or additive use); USES (Uses)
       (treated with di-Me dihydrogenated tallow alkyl ammonium chloride;
       production of functionalized **elastomer nanocomposites**
       containing **clay** for tire innerliners and innertubes)
T   557-05-1, Zinc stearate   7440-66-6, Zinc, uses   7704-34-9, Sulfur, uses
    RL: MOA (Modifier or additive use); USES (Uses)
       (vulcanization agents; production of functionalized **elastomer**
       nanocomposites containing **clay** for tire innerliners and
       innertubes)
E.CNT 1   THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD
E
1) Toyoda Chuo Kenkyusho Kk; DE 19842845 A 1999 HCAPLUS

75 ANSWER 2 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
N   2004-142966 [14]   WPIX
NC C2004-057569
I   Functionalized **elastomer nanocomposite** for used in,
    e.g. **tire** innerliner, comprises **clay**, and
    elastomer having olefin derived units and functionalized monomer
    units.
C   A18 A95
N   DIAS, A J; GONG, C; KARP, K R; POOLE, B J; TSOU, A H
A   (ESSO) EXXONMOBIL CHEM PATENTS INC
YC 102
I   WO 2004005388   A1 20040115 (200414)* EN   54   C08K003-34
       RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS
           LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
        W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
           DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
           KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT
           RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA
           ZM ZW
DT WO 2004005388 A1 WO 2003-US17204 20030530
RAI US 2002-394152P   20020705
C   ICM C08K003-34
    ICS C08C019-28; C08F008-00
B   WO2004005388 A UPAB: 20040226
    NOVELTY - A functionalized **elastomer nanocomposite**
    comprises **clay**, and **elastomer** having 2-10 carbon atoms
    (C) olefin derived units and functionalized monomer units.
         DETAILED DESCRIPTION - Functionalized **elastomer**
    nanocomposite comprises **clay**; and **elastomer**
    having 2-10 carbon atoms (C) olefin derived units, and functionalized
    monomer units with functional groups pendant to the **elastomer**
    (E) from formula (I) or (II).
    Q = O, or NR1;
         R1 = H, 1-20C alkyls, alkenyls, or aryls, or substituted 1-20C
    alkyls, alkenyls, or aryls;
         R2, 2' = H, 1-20C alkyls, alkenyls, or aryls, substituted 1-20C
    alkyls, alkenyls, or aryls, hydroxyl, or 1-20C alkoxys;
         R3, R4 = -OR5 or -NHR5;
    R5 = R1.
         An INDEPENDENT CLAIM is also included for a method of forming

nanocomposite comprising contacting **elastomer**, functionalizing compound(s), free radical initiator(s), and **clay** .

USE - For used in **tire** innerliner, innertube (claimed), and air barriers.

ADVANTAGE - The invention has improved air barrier properties.

Dwg.0/0

S   CPI
A   AB; GI
C   CPI: A04-H00H; A08-R06B; A10-E01; A12-T01

75 ANSWER 3 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
N   2004-229520 [22]   WPIX
NC   C2004-090209
I   Production of composite materials useful in the fields of packaging, liquid and gas storage and coatings comprises heating and shearing a mixture of a thermoplastic polymer and organophilic lamellar filler **particles.**
C   A18 A28 A35 A92 A93 A95 A96 E37
N   BAYET, A; BOUCARD, S; PRELE, P
A   (MULT-N) MULTIBASE SA
YC   105
I   FR 2842758   A1 20040130 (200422)*   55   B29B007-90
     WO 2004012917   A2 20040212 (200422) FR   B29B000-00
       RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS
           LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
        W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
           DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
           KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PG PH
           PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC
           VN YU ZA ZM ZW
DT   FR 2842758 A1 FR 2002-9509 20020726; WO 2004012917 A2 WO 2003-FR2335 20030724
RAI FR 2002-9509   20020726
C   ICM B29B000-00; B29B007-90
     ICS B29C070-26; **C08K009-04**
CI   B29K309:00
.B   FR   2842758 A UPAB: 20040331

NOVELTY - Production of composite materials comprising inorganic filler **nanoparticles** in a thermoplastic polymer matrix comprises heating and shearing a mixture of a thermoplastic polymer and organophilic lamellar filler **particles** under pressure, reducing the shear rate to exfoliate the **particles** and degassing the mixture.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for composite materials produced as above.

USE - The composite materials are useful in the fields of packaging, liquid and gas storage and coatings, especially in (para)medical and (para)pharmaceutical fields and the fields of hygiene, cosmetics, petroleum, electrical construction, electrical appliances, toys, automobile, naval, aircraft and railway construction, building and space (all claimed).

ADVANTAGE - The filler **particles** are completely exfoliated and homogeneously dispersed in the polymer matrix.

Dwg.0/8

S   CPI
A   AB; DCN
IC   CPI: A08-R01; A11-A; A11-A02B; A11-A03; E05-G03A; E05-T; E10-A22G;
          E10-B04D; E31-P02D

L75 ANSWER 4 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN   2004-271546 [26]   WPIX
DNC C2004-105556
TI   High-viscosity thermoplastic composition for extrusion blow molding comprises **nanoparticulate** filler, fibrous filler and impact modifier.
DC   A26 A88 A92 A95 E19 G02 Q32
IN   KETTL, R; STOEPPELMANN, G
PA   (INVE) EMS-CHEM AG
CYC 32
PI   EP 1394197   A1 20040303 (200426)* GE   15   C08K003-00   <--
        R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV
           MC MK NL PT RO SE SI SK TR
     DE 10239326   A1 20040318 (200426)   C08K003-34   <--
     JP 2004083911   A 20040318 (200426)   20   C08L077-00   <--
ADT EP 1394197 A1 EP 2003-15807 20030710; DE 10239326 A1 DE 2002-10239326 20020827; JP 2004083911 A JP 2003-300226 20030825
PRAI DE 2002-10239326   20020827
IC   ICM **C08K003-00; C08K003-34; C08L077-00**
     ICS B29B007-38; B65D001-02; **C08J005-04; C08K007-02; C08L067-00; C08L067-02; C08L101-00**
ICI C08K003-00, C08K003:22, C08K003:40
AB   EP   1394197 A UPAB: 20040421
NOVELTY - Thermoplastic (polyamide, polyester, polyetherester or polyesteramide) composition suitable for extrusion blow molding includes 0.5-15 weight% of a **nanoparticulate** filler, 5-30 weight% of a fibrous filler and 3-12 weight% of an impact modifier.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(1) production of the composition by either melting the polymer and incorporating the fillers and impact modifier in an extrusion process or mixing the thermoplastic, fillers and impact modifier at 160-350 deg. C and injecting up to 30 weight% of a liquid (especially **water**) into the melt;

(2) shaped products produced using the composition;

(3) production of the shaped products in one or more stages by coextrusion, extrusion blow molding, pressing or coating.

USE - For extrusion blow molding to produce shaped products, hollow products (especially bottles), semifinished products, plates and tubes (all claimed).

ADVANTAGE - The **nanoparticulate** filler increases the melt viscosity of the composition by at least 30% compared with conventional mineral fillers.

Dwg.0/0
FS   CPI GMPI
FA   AB; DCN
MC   CPI: A08-M09B; A08-R01; A09-A05A; A11-A03; A11-B07; A11-B10; A12-R01; E31-P03; E31-P05A; G02-A05

L75 ANSWER 5 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
AN   2004:169054 HCAPLUS
ED   Entered STN: 02 Mar 2004
TI   Influence of **clay** on the vulcanization kinetics of fluoroelastomer **nanocomposites**
AU   Kader, M. Abdul; Nah, Changwoon
CS   Duckjin-gu, Duckjin-dong, 664-14, Department of Polymer Science and Technology, Chonbuk National University, Jeonju, Chonbuk, 561-756, S. Korea

SO Polymer (2004), 45(7), 2237-2247
CODEN: POLMAG; ISSN: 0032-3861
PB Elsevier Science Ltd.
DT Journal
LA English
CC 39 (Synthetic Elastomers and Natural **Rubber**)
AB The vulcanization kinetics of gum and **montmorillonite** (Na-MMT) **clay** filled fluoroelatomer (FKM) **nanocomposite** was studied using both oscillating disk rheometer and differential scanning calorimetry under isothermal and dynamic conditions. The X-ray diffraction pattern of **clay** filled FKM showed a shift in d-spacing toward higher values indicating the formation of intercalated silicate layer. The cure characterization showed higher rate and state of vulcanization of modified **clay** filled compound than that of gum and unmodified **clay** filled FKM indicating the accelerating effect of **quaternary** ammonium salt modified **clay**. Although the unmodified **clay** slowed down the cure reaction, there was marked increase in cure rate at higher level of curative. Higher loading of **clay** decreased the cure rate with lowering of maximum torque values. The presence of organoclay increased the torque value through the formation of confined **elastomer** network within the silicate galleries. The exptl. data obtained provided the evidence that the curing behavior illustrated autocatalytic characteristics. The kinetic parameters determined from the model equation had good agreement with the exptl. results. The calculated activation energy of the gum and **clay** filled systems indicated the ease of cure process with respect to the type of **clay**. The cure kinetics measured by different methods was well correlated with each other.
RE.CNT 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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L75 ANSWER 6 OF 59 COMPENDEX COPYRIGHT 2004 EEI on STN
AN 2004(16):6608 COMPENDEX
TI Synthetic routes, properties and future applications of polymer-layered silicate **nanocomposites.**
AU Ahmadi, S.J. (Department of Applied Chemistry Faculty of Science Harbin Institute of Technology, Harbin 150001, China); Huang, Y.D.; Li, W.
SO Journal of Materials Science v 39 n 6 Mar 15 2004 2004.p 1919-1925
CODEN: JMTSAS ISSN: 0022-2461
PY 2004
DT Journal
TC Bibliography; Theoretical; Experimental
LA English
AB This paper focuses on polymer **nanocomposites** and their syntheses, properties and future applications, several of these application will be successful in the near future. This new type of materials, based on smectite **clays** usually rendered hydrophobic through ionic exchange of the sodium interlayer **cation** with an onium **cation,** may be prepared via various synthetic routes comprising exfoliation adsorption, in-situ intercalative polymerization and melt intercalation. The whole range of polymer matrices covered, i.e., thermoplastics, thermosets and **elastomers.** Small addition - typically less than 6 wt% - of these **nanoscale** inorganic fillers promote concurrently several properties of the polymer materials, including tensile characteristics, heat distortion temperature, scratch resistance, gas permeability resistance, and flame retardancy. $CPY 2004 Kluwer Academic Publishers. 63 Refs.
CC 815.1 Polymeric Materials; 933.1 Crystalline Solids; 549.1 Alkali Metals; 818.2 Elastomers; 483.1 Soils and Soil Mechanics; 414 Masonry Materials
CT *Polymers; Crystal lattices; Van der Waals forces; Mechanical permeability; Elastic moduli; Intercalation compounds; Delamination; **Nanostructured** materials; Sodium; **Elastomers;** **Clay;** Silicates; Carbon carbon composites
ST Interlayers; Flame retardancy; Scratch resistance

L75 ANSWER 7 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN
AN R:908598 RAPRA FS Rapra Abstracts
TI THERMOPLASTIC OLEFIN/**CLAY NANOCOMPOSITES**: MORPHOLOGY AND MECHANICAL PROPERTIES.
AU Mehta S; Mirabella F M; Rufener K; Bafna A (Equistar Chemicals; Cincinnati,University)
SO Journal of Applied Polymer Science 92, No.2, 15th April p.928-36
ISSN: 0021-8995
CODEN: JAPNAB
PY 2004
DT Journal
LA English
AB The use of a **quaternary** ammonium salt modified **clay** as filler in commercial thermoplastic polyolefin (TPO)

nanocomposites, prepared using masterbatching and final mixing processes by melt compounding, was examined by X-ray diffraction, transmission electron microscopy, atomic force microscopy, flexural and impact properties, and rheological properties. The masterbatching process utilised maleic anhydride grafted polypropylene as a compatibiliser with between **clay** and TPO, and **clay** levels of between 0.6 to 5.6 percent were tested in the final compound. Breakup of the ethylene propylene **rubber particles** in the TPO was observed as **clay** level increased, increasing melt viscosity, flexural modulus and impact strength in unnotched (Izod) impact samples, but reducing impact strength in notched samples. 20 refs.

C 42C1; 42C12; 611; 42C11C12; 51SCL; 627; 9511; 9518; 9912; 991; 9924; 9.10.2; 9.11.2

C *OG; KE; MB; UL; UG; UJ; UK

T ATOMIC FORCE MICROSCOPY; CHARACTERISATION; CHARACTERIZATION; CHEMICAL MODIFICATION; COMPATIBILISER; COMPATIBILIZER; COMPOUND; DATA; DIFFRACTION; DISPERSION; **ELASTOMER**; EPM; EPR; ETHYLENE-PROPYLENE COPOLYMER; FILLER; FLEXURAL PROPERTIES; FRACTURE MORPHOLOGY; GRAPH; IMPACT PROPERTIES; INSTITUTION; MALEIC ANHYDRIDE GROUP; MECHANICAL PROPERTIES; MELT FLOW INDEX; MELT INDEX; MICROGRAPHY; MICROSCOPY; MODIFICATION; MORPHOLOGICAL PROPERTIES; MORPHOLOGY; **NANOCOMPOSITE**; **PARTICLE SIZE**; PLASTIC; POLYPROPENE; POLYPROPYLENE; PP; PROPENE POLYMER; PROPERTIES; PROPYLENE POLYMER; PROPYLENE-ETHYLENE COPOLYMER; RHEOLOGICAL PROPERTIES; RHEOLOGY; SCANNING ELECTRON MICROSCOPY; SCATTERING; TABLES; TECHNICAL; TEM; THERMOPLASTIC; **THERMOPLASTIC ELASTOMER**; **THERMOPLASTIC RUBBER**; TRANSMISSION ELECTRON MICROSCOPY; X-RAY DIFFRACTION; X-RAY SCATTERING

PT **CLAY**

HR **NANOCOMPOSITES**, olefin polymers, fillers, compounding, characterisation; FILLERS OF, **clay**; FILLERS IN, olefin polymers; MIXING, melt mixing, masterbatching, final mixing, fillers, olefin polymers, compatibilisers; COMPATIBILISERS, propylene polymers; PROPYLENE POLYMERS, compatibilisers, maleic anhydride grafted; CHARACTERISATION, **nanocomposites**, olefin polymers, rheological properties, X-ray diffraction, impact properties, flexural properties, microscopy, TEM, atomic force microscopy

T USA

N CLOISITE 20A

75 ANSWER 8 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN

N 2003:970411 HCAPLUS

N 140:147475

D Entered STN: 12 Dec 2003

I Melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin

U Varghese, Siby; Karger-kocsis, J.

S Institut fuer Verbundwerkstoffe GmbH, Kaiserslautern University of Technology, Kaiserslautern, D-67663, Germany

O Journal of Applied Polymer Science (2004), 91(2), 813-819
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B John Wiley & Sons, Inc.

T Journal

A English

C 39-9 (Synthetic Elastomers and Natural **Rubber**)

B Composites based on natural **rubber** (NR) and containing organophilic and pristine layered silicates of natural and synthetic origin were produced by melt compounding and sulfur curing. The curing, thermomech.,

and mech. properties of the mixes, which contained 10 phr (parts per hundred parts of **rubber**) silicates, were determined The dispersion of the silicates was studied by X-ray diffraction (XRD) and transmission electron microscopy (TEM). Organophilic **clays** accelerated the sulfur curing of NR, which was believed to occur because of a complexation reaction in which the amine groups of the **clay** intercalants participated. The property improvements caused by the fillers were ranked as follows: organophilic **clays** > pristine synthetic layered silicate (sodium fluorohectorite) > pristine natural **clay** (purified sodium **bentonite**) > precipitated nonlayered silica (used as a reference). This was attributed to partial intercalation of the organophilic **clay** by NR on the basis of XRD and TEM results and to the high aspect ratio of the fluorohectorite. Apart from intercalation, severe confinement (i.e., the collapse of the interlayer distance) of the organoclays was observed This peculiar feature was traced to the formation of a zinc coordination complex, which extracted the amine intercalant of the organoclays, thus causing the collapse of the layers.

ST **montmorillonite** mica layered silicate composite natural **rubber**

IT **Quaternary** ammonium compounds, uses
RL: MOA (Modifier or additive use); USES (Uses)
(bis(hydroxyethyl)methyltallow alkyl, chlorides, **montmorillonite** modifying agent; melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT Hardness (mechanical)
Storage modulus
Tensile strength
(melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT Natural **rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT Intercalation compounds
RL: PRP (Properties)
(melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT Deformation (mechanical)
(resilience; melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT **Bentonite**, properties
RL: PRP (Properties)
(sodian; melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT Strength
(tearing; melt-compounded natural **rubber nanocomposites** with pristine and organophilic layered silicates of natural and synthetic origin)

IT **1318-93-0, Montmorillonite**, properties 7631-86-9, Ultrasil VN2, properties 182636-27-7, Somasif ME 100 309295-00-9, Cloisite 30B 402944-35-8, **Nanomer** I 30P
RL: PRP (Properties)

(melt-compounded natural **rubber nanocomposites** with
pristine and organophilic layered silicates of natural and synthetic
origin)
T 124-30-1, Octadecylamine
RL: MOA (Modifier or additive use); USES (Uses)
(**montmorillonite** modifying agent; melt-compounded natural
rubber nanocomposites with pristine and organophilic
layered silicates of natural and synthetic origin)
E.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD
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3) Ganter, M; Kautsch Gummi Kunstst 2001, V54, P166 HCAPLUS
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16) Schon, F; Macromol Symp 2002, V189, P105 HCAPLUS
17) Usuki, A; Polymer 2002, V43, P2185 HCAPLUS
18) Utracki, L; Arab J Sci Eng 2002, V27, P43 HCAPLUS
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23) Wang, Y; J Appl Polym Sci 2000, V78, P1879 HCAPLUS
24) Zanetti, M; Macromol Mater Eng 2000, V279, P1 HCAPLUS
25) Zhang, L; J Appl Polym Sci 2000, V78, P1873 HCAPLUS

75 ANSWER 9 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
N 2003:899853 HCAPLUS
D Entered STN: 18 Nov 2003
I Influence of **clay** modification on the structure and mechanical
properties of EPDM/**montmorillonite nanocomposites**
U Zheng, Hua; Zhang, Yong; Peng, Zonglin; Zhang, Yinxi
S School of Chemistry and Chemical Technology, Skate Key Laboratory of Metal
Matrix Composites, Shanghai Jiao Tong University, Shanghai, 200240, Peop.
Rep. China
O Polymer Testing (2004), 23(2), 217-223
CODEN: POTEDZ; ISSN: 0142-9418
B Elsevier Science Ltd.
T Journal
A English
C 39-12 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 37
B Conditions were established for dispersing organic **montmorillonite**
(OMMT) **nano** layers into ethylene-propylene-diene **rubber**
(EPDM) matrix in a HAAKE mixer. The exptl. results of X-ray diffraction
and transmission electron microscopy showed that the MMT modified with
trimethyl-octadecyl amine or dimethylbenzyl-octadecyl amine existed in the
form of an intercalated layer structure and the MMT modified with

methyl-bis(2-hydroxyethyl)cocoalkylamine was fully exfoliated in the EPDM matrix. The expansion of the distance between the silicate layers firstly took place after the HAAKE mixing, then the silicate layers were exfoliated in the EPDM matrix after the EPDM/OMMT composite was cured. The EPDM/OMMT composites had good mech. properties. The EPDM composite containing 15 weight% OMMT which was modified with the alkylamine containing hydroxyl groups showed high tensile strength of 25 MPa. Dynamic mech. anal. revealed that the glass transition temperature (Tg) of the composites was higher than that of gum EPDM vulcanizate. The OMMT had delaying effects on the vulcanization reaction and decreased the crosslink d. of the EPDM/OMMT composites.

ST EPDM **montmorillonite** alkylammonium hybrid **nanocomposite** torque intercalation exfoliation; **nanocomposite** vulcanization viscoelasticity mech loss hardness tensile strength morphol

T EPDM **rubber**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(Nordel IP-NDR 4770R; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T Elongation at break
Exfoliation
Hardness (mechanical)
Hybrid organic-inorganic materials
Intercalation
Mechanical loss
Nanocomposites
Tensile strength
Torque
Viscoelasticity
Vulcanization
Young's modulus
(**clay** modification of EPDM/**montmorillonite nanocomposites**)

T Reinforced plastics
RL: PRP (Properties)
(**clay** modification of EPDM/**montmorillonite nanocomposites**)

T **Quaternary** ammonium compounds
RL: MOA (Modifier or additive use); USES (Uses)
(coco alkylbis(hydroxyethyl)methyl, chlorides, **montmorillonite** modification product; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T EPDM **rubber**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(ethylene-ethylidenenorbornene-propene; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T Polymer morphology
(micromorphol.; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T **Clays**
RL: MOA (Modifier or additive use); USES (Uses)
(montmorillonitic; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T Strength
(tearing; **clay** modification of EPDM/**montmorillonite nanocomposites**)

T **1318-93-0D, Montmorillonite, quaternary**

ammonium ions-exchanged 15461-40-2D, Trimethyloctadecylammonium, reaction product with **montmorillonite** 37612-69-4D, reaction product with **montmorillonite**
RL: MOA (Modifier or additive use); USES (Uses)
(**clay** modification of EPDM/**montmorillonite** **nanocomposites**)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

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(5) Maiti, S; Rubber Chem Technol 1992, V65, P293 HCAPLUS
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(19) Yen, T; J Appl Polym Sci 2001, V82, P1391
(20) Young, W; Polym Int 2002, V51, P319

L75 ANSWER 10 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
AN 2003:590853 HCAPLUS
DN 139:150919
ED Entered STN: 01 Aug 2003
TI A process for preparing **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**
IN Ajbani, Manoj; Geiser, Joseph Frank; Parker, Dane Kenton
PA USA
SO U.S. Pat. Appl. Publ., 15 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM C08K003-34
NCL 524445000; 524449000
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003144401	A1	20030731	US 2001-37009	20011221
PRAI	US 2001-37009		20011221		

AB The title process comprises blending an **aqueous** dispersion (A) of a functionalized diene-based **elastomer** having Tg (-120)-10° and mol. weight 1000-1,000,000, and a multilayered swellable silicate **clay**. The **nanocomposites** in this invention are useful for manufacture of articles such as tires including tire tread, tire sidewall and/or tire inner liner. In one example 39.1 g a maleated butadiene **rubber** (Ricon 131MA20) was dispersed in solution containing 4.1 g Triton X 100 (surfactant) and 750 mL **water** at 75°, added with 2.06 g NaOH to pH 8-8.5, then mixed with 69.05 g Cloisite 30B (organic

clay)to give a title **nanocomposite.**
T functionalized diene **elastomer** layered **clay** **nanocomposite** prepn process; tire tread sidewall belt butadiene **rubber clay nanocomposite** prepn
T Synthetic **rubber,** properties
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(butadiene-isoprene; **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)
T **Quaternary** ammonium compounds, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**clay** intercalating agent; **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)
T **Clays,** uses
RL: MOA (Modifier or additive use); USES (Uses)
(intercalated; **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)
T Tires
(liners; **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful therefor)
T Butadiene **rubber,** properties
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(maleated, Ricon 131MA20; prepns. of **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**
)
T Isoprene-styrene **rubber**
Styrene-butadiene rubber, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)
T **Nanocomposites**
(of functionalized diene-based **elastomer** and layered **clay** useful for tire products)
T Tires
(sidewalls; **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful therefor)
T Tires
(treads; **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful therefor)
T 9003-17-2
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(butadiene **rubber,** maleated, Ricon 131MA20; prepns. of **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**)
T 25038-32-8
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(isoprene-styrene **rubber, nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)
T **1318-93-0,** Cloisite Na+, uses   214474-11-0, Cloisite 15A

292833-56-8, Cloisite 25A 309295-00-9, Cloisite 30B
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(prepns. of **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**)

IT **9003-55-8**
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(**styrene-butadiene rubber**, **nanocomposite** from functionalized diene-based **elastomer** and layered **clay** useful for tire products)

IT 9002-93-1, Triton X 100
RL: NUU (Other use, unclassified); USES (Uses)
(surfactant; prepns. of **nanocomposite** from functionalized diene-based **elastomer** and layered **clay**)

L75 ANSWER 11 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
AN 2003:488625 HCAPLUS
DN 139:54173
ED Entered STN: 27 Jun 2003
TI **Nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires

applicants

IN Parker, Dane Kenton; Larson, Brent Kevin; Yang, Xiaoping
PA The Goodyear Tire & Rubber Company, USA
SO Eur. Pat. Appl., 18 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C08K009-00
ICS C08K009-04; C08K009-06; C08K003-00; C08K003-34; C08K003-36; C08L009-00; C08L021-00; C08J003-215
CC 39-13 (Synthetic Elastomers and Natural **Rubber**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1321489	A1	20030625	EP 2002-28118	20021218
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
	US 2004054059	A1	20040318	US 2001-37539	20011221
	JP 2003192833	A2	20030709	JP 2002-372736	20021224
PRAI	US 2001-37539	A	20011221		

AB This invention relates to preparation and use of **nanocomposites** comprised of an **elastomer** matrix containing a dispersion therein of at least partially exfoliated **platelets** of an intercalated, multilayered, **water** swellable **clay** (e.g. **montmorillonite clay**). The exfoliated **platelets** are derived from such intercalated **clay** formed by an in situ **cation** exchange phenomenon between **cationically** exchangeable ions within the galleries between the layers of the multilayered **clay** with a pre-formed **latex** of **cationic** (pos. charged) **elastomer particles**. The pos. charged **latex elastomer particles** may be prepared by free radical emulsion polymerization using: (A) a non-polymerizable **cationic** surfactant, and/or (B) a polymerizable **cationic** surfactant. Optionally, an addnl. **cationic** charge may be incorporated onto the **cationic** **elastomer latex particles** through the use and in the presence of: (C) a polymerizable comonomer bearing a

cationic charge, (D) a free radical generating polymerization initiator bearing a **cationic** charge, and/or (E) a free radical chain transfer agent bearing a **cationic** charge. Such free radical induced emulsion polymns. are exclusive of a thermoplastic polymer **latex** and are exclusive of the presence of an anionic surfactant. **Rubber** composites can be prepared by blending such **nanocomposite** with addnl. **elastomer**(s), addnl. reinforcing filler(s) and/or a coupling agent. The invention further relates to the preparation of articles of manufacture, including tires, having at least one component comprised of said **nanocomposite** or said **rubber** composite. Such a tire component may be selected from, for example, tire tread and tire inner liner.

ST **nanocomposite** exfoliated **clay platelet** **elastomer** tire tread inner liner

IT Polymerization catalysts
(anionic; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Polymerization catalysts
Surfactants
(**cationic**; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **Clay** minerals
RL: MOA (Modifier or additive use); USES (Uses)
(**hectorite**-like; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Tires
(liners, inner liner; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **Clays**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(montmorillonitic; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **Nanocomposites**
Nanoparticles
Tires
(preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **Styrene-butadiene rubber**, preparation
RL: IMF (Industrial manufacture); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Polymerization catalysts
(radical, redox; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Polymerization catalysts
(radical; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT Tires
(treads; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **7727-21-1**, Potassium peroxydisulfate **7727-54-0**, Ammonium peroxydisulfate
RL: CAT (Catalyst use); USES (Uses)
(anionic polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT **2997-92-4**, 2,2'-Azobis(2-methylpropionamidine) dihydrochloride **27776-21-2**
RL: CAT (Catalyst use); USES (Uses)
(**cationic** polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT **1318-93-0, Montmorillonite,** uses **12172-85-9, Beidellite 12173-47-6, Hectorite 12286-87-2, Volkonskoite 12424-32-7, Sauconite**
RL: MOA (Modifier or additive use); USES (Uses)
(**clays**; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT 78-67-1, AIBN 94-36-0, Benzoyl peroxide, uses 26762-93-6
RL: CAT (Catalyst use); USES (Uses)
(free radical polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT 79-10-7D, Acrylic acid, esters, mono and diquaternary ammonium salts 79-41-4D, Methacrylic acid, esters, mono and diquaternary ammonium salts 1337-81-1D, Vinyl pyridine, alkyl bromide or chloride **quaternary** salts 2039-80-7D, p-Vinylbenzene dimethylamine, alkyl bromide or chloride **quaternary** salts 2155-94-4D, N,N-Dimethylallylamine, alkyl bromide or chloride **quaternary** salts 2867-47-2D, 2-Dimethylaminoethyl methacrylate, alkyl bromide or chloride **quaternary** salts 5339-11-7D, m-Vinylbenzene dimethylamine, alkyl bromide or chloride **quaternary** salts **14314-78-4** 29383-23-1D, Vinyl imidazole, alkyl bromide or chloride **quaternary** salts **84092-72-8**, Vinylbenzylamine hydrochloride **94291-22-2**, 11-Acryloylundecyltrimethylammonium bromide **96536-37-7**, 11-Methacryloylundecyltrimethylammonium bromide **185144-29-0**, 5-(Para-vinylphenyl) pentyltrimethylammonium bromide **188437-43-6**, N-((11-Methacryloyloxy)undecyl-4-methyl pyridinium bromide
RL: MOA (Modifier or additive use); USES (Uses)
(free radically polymerizable **cationic** surfactant; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT 25103-58-6, tert-Dodecanethiol
RL: MOA (Modifier or additive use); USES (Uses)
(mol. weight regulators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT **57-09-0**, Cetyl trimethyl ammonium bromide
RL: MOA (Modifier or additive use); USES (Uses)
(non free-radically polymerizable **cationic** surfactant; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)
IT **112-02-7**, Cetyltrimethylammonium chloride
RL: MOA (Modifier or additive use); USES (Uses)
(non free-radically polymerizable **cationic** surfactants;

preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT 1319-41-1, Saponite
RL: MOA (Modifier or additive use); USES (Uses)
(preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **7720-78-7,** Ferrous sulfate
RL: CAT (Catalyst use); USES (Uses)
(redox free radical polymerization initiators; preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **9003-55-8P,** Styrene-1,3-butadiene copolymer
RL: IMF (Industrial manufacture); **POF (Polymer in formulation);** TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**rubbers;** preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

IT **9003-55-8P**
RL: IMF (Industrial manufacture); **POF (Polymer in formulation);** TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**styrene-butadiene rubber,** preparation of **nanocomposite** and exfoliated **clay platelets** formed in situ within **elastomer** for tires)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Elspass, C; US 5883173 A 1999
(2) Exxon Research Engineering Co; WO 9700910 A 1997 HCAPLUS
(3) Zanetti, M; MACROMOL MATER ENG 2000, V279, P1 HCAPLUS

L75 ANSWER 12 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:299060 HCAPLUS
DN 138:322521
ED Entered STN: 18 Apr 2003
TI **Rubber** composition with high vibration damping capacity
IN Taguchi, Takehiko; Shinohara, Koji
PA Tokai Rubber Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08L021-00
ICS C08K009-04; F16F015-08; B60K005-12
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003113271	A2	20030418	JP 2001-305489	20011001
PRAI	JP 2001-305489		20011001		

AB The **rubber** composition contains layered **clay** minerals, which form **nanodispersion** (**nanocomposite**) at 2-10 layers, i.e., not at single layer structure. The composition, showing damping capacity from low to high temperature region, is made into a vibration damper or an automobile engine mount. Thus, 10 g Na-**montmorillonite** and 5 g di(hardened tallow alkyl)dimethylammonium chloride were subjected to ion exchanging to give an organic smectite, 10 parts of which was mixed with

natural **rubber** 100, ZnO 5, stearic acid 1, S 2, and a vulcanization accelerator 1 part and vulcanized to give test pieces showing large loss tangent in wide range of temperature

ST **rubber** high vibration damping capacity **nanocomposite**; layered **clay** mineral multilayered **nanodispersion** **rubber**; natural **rubber** modified **montmorillonite** vibration damper; org ammonium chloride modified sodium **montmorillonite**; engine mount vibration damper **rubber** compn

IT **Quaternary** ammonium compounds, preparation
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PREP (Preparation); USES (Uses)
(ion-exchanged with sodium-**montmorillonite**; **rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT **Clay** minerals
RL: MOA (Modifier or additive use); USES (Uses)
(layered; **rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT **Nanocomposites**
Vibration dampers
(**rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT Natural **rubber**, uses
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(**rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

IT Internal combustion engines
(**rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity for)

IT **1318-93-0DP, Montmorillonite** ((Al1.33-1.67Mg0.33-0.67)(Ca0-1Na0-1)0.33Si4(OH)2O10.xH2O), ion-exchanged with **quaternary** ammonium chloride, preparation
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PREP (Preparation); USES (Uses)
(sodium-rich; **rubber** composition containing **nanodispersion** of layered **clay** mineral with high vibration damping capacity)

L75 ANSWER 13 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:146523 HCAPLUS
DN 138:189235
ED Entered STN: 26 Feb 2003
TI Composition of modified butyl **rubber** containing layered **clay** minerals
IN Maruyama, Tsukasa; Sekine, Yuko; Ishikawa, Kazunori
PA Yokohama Rubber Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08L023-32
ICS C08K003-34
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003055514	A2	20030226	JP 2001-244337	20010810

PRAI JP 2001-244337 20010810
AB The composition contains the modified butyl **rubber** substituted with phosphonium salt group and layered **clay** minerals treated with organic compds. wherein **nanocomposites** of the layered **clay** minerals uniformly dispersed in the **rubber** are formed. Thus, 100 g Na-type **montmorillonite** (Kunipia F) was added to **water** containing 93.2 g dioleyldimethylammonium chloride to give the treated **clay** mineral, 8 parts of which was mixed with 100 parts butyl **rubber** (Exxpro, brominated) and 5 parts PPh3 and molded to give a sheet showing no x-ray diffraction peaks corresponding to **clay** minerals and good solubility to MePh.
ST butyl **rubber nanocomposite** layered **clay** mineral; org compd treated layered **clay** mineral dispersibility; phosphonium salt butyl **rubber clay** mineral; dioletyldimethylammonium chloride modified sodium **montmorillonite**
IT **Nanocomposites**
(butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT Phosphonium compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(butyl **rubber**; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT Synthetic **rubber**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(isobutylene-methylstyrene, brominated, Exxpro, phosphonium salts; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT Materials
(layered; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT **Clay** minerals
RL: MOA (Modifier or additive use); USES (Uses)
(layered; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT Butyl **rubber**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(phosphonium salts; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT 7212-69-3, Dioleyldimethylammonium chloride
RL: MOA (Modifier or additive use); USES (Uses)
(Nissan **Cation** 20L; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT 187247-40-1, Kunipia F
RL: MOA (Modifier or additive use); USES (Uses)
(butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT 9010-85-9
RL: TEM (Technical or engineered material use); USES (Uses)
(butyl **rubber**, phosphonium salts; butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)
IT 603-35-0D, Triphenylphosphine, salt with butyl **rubber**
RL: TEM (Technical or engineered material use); USES (Uses)
(in butyl **rubber** composition containing organic compound-modified layered **clay** minerals showing good dispersibility)

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L75  ANSWER 14 OF 59  WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN   2003-865200 [80]   WPIX
DNC  C2003-244582
TI   Cross-linkable and/or cross-linked nanofiller composition for
     use in use in manufacturing articles e.g. tube, pipe, film, or tile,
     comprises ethylene (co)polymer and intercalated nanofiller.
DC   A17 A92 A93 E37
IN   MAYER, H A; MCMAHON, W J
PA   (COMP-N) COMPCO PTY LTD
CYC  103
PI   WO 2003082966   A1 20031009 (200380)* EN   47    C08K003-34     <--
        RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS
            LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
         W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
            DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
            KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PH PL
            PT RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG US UZ VC VN YU
            ZA ZM ZW
ADT  WO 2003082966 A1 WO 2003-AU385 20030328
PRAI AU 2002-1464         20020328
IC   ICM  C08K003-34
AB   WO2003082966 A UPAB: 20031211
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NOVELTY - A cross-linkable and/or cross-linked **nanofiller** composition comprises ethylene (co)polymer and intercalated **nanofiller**.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(a) preparing a cross-linkable and/or cross-linked **nanofiller** composition comprising mixing and delaminating and/or exfoliating in one step a cross-linkable and/or cross-linked ethylene (co)polymer and an intercalated **nanofiller**, delaminating and/or exfoliating the **nanofiller**, or delaminating and/or exfoliating intercalated **nanofiller**, and mixing the delaminated and/or exfoliated and intercalated **nanofiller** with a cross-linkable and/or cross-linked ethylene (co)polymer; and

(b) preparing the article comprising forming or shaping the **nanofiller** composition, or combining the layers of the **nanofiller** composition with the other layer, cross-linking the **nanofiller** composition, and heating and stretching the **nanofiller** composition and cooling the stretched composition.

USE - The composition is for use in manufacturing articles e.g., tube, pipe, film, sheet, tile, floor covering, container or packaging for food (claimed).

It can be used in applications such as medical (e.g. protective gear and clothing, medicine containers, or layered products); defense and work protection (e.g. protection against external chemicals, or substances); transport (e.g. in land vehicles, trains, subways sea ships, air transport or liquids or gases such as pipelines, pipes for hot **water** under pressure and gas); constructions (e.g. high rise, towers, installations and rooms with electronics, switches, computers, offices, public areas, theatres, cinemas, malls, stations, airports, telecom installations, storage pipes and tubes); agriculture; food (e.g. packaging of consumables, protecting food in laminated films); and packaging (of chemicals, paints, liquid solutions, dispersions, and **aqueous** or solvent based).

ADVANTAGE - The inventive composition possess increased barrier properties, strength and higher heat distortion temperatures.

Dwg.0/0

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FS   CPI
FA   AB; DCN
MC   CPI: A04-G01B; A08-R01; A11-B01; E10-A04B1D; E10-A04B2D; E10-A21; E10-A22;
          E10-A22A; E10-A22E; E10-A22G; E31-D04; E31-P02D; E31-P04; E31-P05;
          E34-B02; E34-C02; E34-D; E34-D03

L75  ANSWER 15 OF 59  WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN   2003-814973 [77]    WPIX
DNN  N2003-652317        DNC C2003-226972
TI   Hydraulic pipe for automobiles has at least one layer made from a
     polyamide molding composition containing nano scale filler.
DC   A23 A88 E37 P73 Q67
IN   HOFFMANN, M; STOEPPELMANN, G; STOPPELMANN, G
PA   (INVE) EMS-CHEM AG; (HOFF-I) HOFFMANN M; (STOP-I) STOPPELMANN G
CYC  33
PI   EP 1333052       A1 20030806 (200377)* GE   11    C08K003-22     <--
        R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC
           MK NL PT RO SE SI SK TR
     DE 10204395      A1 20030918 (200377)             F16L011-04
     JP 2003247672    A  20030905 (200377)        9    F16L011-04
     US 2003190444    A1 20031009 (200377)             B32B001-08
     KR 2003066350    A  20030809 (200402)             F16L009-14
     DE 10204395      B4 20040129 (200408)             F16L011-04
ADT  EP 1333052 A1 EP 2002-28270 20021216; DE 10204395 A1 DE 2002-10204395
     20020204; JP 2003247672 A JP 2003-19329 20030128; US 2003190444 A1 US
     2003-357104 20030203; KR 2003066350 A KR 2003-5136 20030127; DE 10204395
     B4 DE 2002-10204395 20020204
PRAI DE 2002-10204395      20020204
IC   ICM  B32B001-08; C08K003-22; F16L009-14; F16L011-04
     ICS  B29D023-00; B32B027-20; B32B027-34; C08K009-04;
          C08L077-00
AB   EP  1333052 A UPAB: 20031128
     NOVELTY - A hydraulic pipe for automobiles is based on thermoplastic
     polymers and contains at least one layer made from a polyamide molding
     composition containing 0.5-50, preferably 1-30, weight% of a nano
     scale filler per 100 weight% of the polymer matrix.
          DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for
     preparation of the hydraulic pipe (HP) as described below in one or more
     stages by injection molding, coextrusion, extrusion-blow forming,
     pressing, or by a sheathing (sic) process.
          USE - The HP is useful for hydraulic liquid transport, especially for
     automobile brake pipes and couplings.
          ADVANTAGE - Surprisingly the HP containing nano scale
     fillers have increased barrier action against water and the
     permeation of gases and liquids, increased rupture strength up to 130 deg.
     C, decreased volume changes over the temperature range -40 to 130 deg. C,
     a water permeation into the HP of less than 2-3%, show no
     degradation reaction in contact with hydraulic fluids and show good cold
     impact strength down to -40 deg. C.
     Dwg.0/0
FS   CPI GMPI
FA   AB; DCN
MC   CPI: A05-F01E2; A08-R01; A12-H02; A12-T04C; E05-E; E31-N04B; E31-P02;
          E31-P03; E31-P04; E31-P05; E34-B01; E34-B02; E34-C02; E34-E; E35

L75  ANSWER 16 OF 59  HCAPLUS  COPYRIGHT 2004 ACS on STN
AN   2003:517602  HCAPLUS
DN   139:246420
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ED Entered STN: 08 Jul 2003
TI A new approach to polymer/**montmorillonite nanocomposites**
AU Ma, Jun; Xu, Jian; Ren, Jian-Hui; Yu, Zhong-Zhen; Mai, Yiu-Wing
CS Mechanical and Mechatronic Engineering, School of Aerospace, Centre for Advanced Materials Technology, The University of Sydney, Sydney, NSW 2006, Australia
SO Polymer (2003), 44(16), 4619-4624
CODEN: POLMAG; ISSN: 0032-3861
PB Elsevier Science Ltd.
DT Journal
LA English
CC 37-5 (Plastics Manufacture and Processing)
Section cross-reference(s): **39**
AB A novel method for preparation of exfoliated/intercalated **nanocomposites** is reported based on two steps, i.e. preparation of treated-**montmorillonite** (MMT) solution and solution blending with polymers. After in situ polymerization of dimethyldichlorosilane between layers and separation of most polydimethylsiloxane (PDMS), the treated-MMT solution shows good storage stability. Although elemental analyzer shows no residue PDMS, NMR proves residue PDMS still exists in the solution The residue PDMS is believed to graft onto the MMT layer surface via condensation of hydroxyl groups of PDMS and those that existed on MMT surface. Lower relaxation time of end-capped CH3 of alkyl ammonium grafted onto layer surface via ion exchanging in the solution shows that the layer spacing was increased significantly or even exfoliated. When the solution was blended with some polar polymers, exfoliated **nanocomposites** were found. When it was blended with some nonpolar polymers, however, intercalated **nanocomposites** were obtained. The reason was explained in the light of compatibility between polymer matrix and MMT as well as alkyl ammonium and PDMS grafted on the layer surface. For intercalated **nanocomposites,** different layer spacing corresponds to different chain flexibility and the presence of multi-peaks is caused by the processing of these blends.
ST polydimethylsiloxane alkylammonium modified **montmorillonite** polymer **nanocomposite**
IT Exfoliation
Intercalation
(in polymer/**montmorillonite nanocomposites**)
IT EPDM **rubber**
Polycarbonates, properties
Styrene-butadiene rubber, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(matrix; new approach to polymer/**montmorillonite nanocomposites**)
IT **Nanocomposites**
(new approach to polymer/**montmorillonite nanocomposites**)
IT Polysiloxanes, preparation
RL: MOA (Modifier or additive use); **POF (Polymer in formulation)**; PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(new approach to polymer/**montmorillonite nanocomposites**)
IT Crystal structure
Microstructure
Thermal stability

(of polymer/**montmorillonite nanocomposites**)
T Spin-lattice relaxation
(of treated **montmorillonite** for **nanocomposites**)
T 31900-57-9, Poly(dimethylsiloxane)
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(assumed monomers, matrix; new approach to polymer/
montmorillonite nanocomposites)
T 9002-86-2, Polyvinyl chloride 9003-53-6, Polystyrene 9016-00-6,
Poly(dimethylsiloxane)
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(matrix; new approach to polymer/**montmorillonite**
nanocomposites)
T **57-09-0DP**, Hexadecyltrimethylammonium bromide, reaction products
with sodium **montmorillonite**, PDMS **1318-93-0DP**,
Montmorillonite ((Al1.33-1.67Mg0.33-0.67)(Ca0-1Na0-
1)0.33Si4(OH)2O10.xH2O), sodium-exchanged, hexadecyltrimethylammonium
bromide modified, reaction products with PDMS 9016-00-6DP,
Poly[oxy(dimethylsilylene)], reaction products with
hexadecyltrimethylammonium bromide modified **montmorillonite**
158158-00-0DP, Dichlorodimethylsilane hydrolytic homopolymer, reaction
products with hexadecyltrimethylammonium bromide modified
montmorillonite
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(new approach to polymer/**montmorillonite**
nanocomposites)
IT **9003-55-8**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(**styrene-butadiene rubber**, matrix; new
approach to polymer/**montmorillonite nanocomposites**)
RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L75 ANSWER 17 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 4
AN 2003:915362 HCAPLUS
DN 140:95381
ED Entered STN: 24 Nov 2003
TI Synthesis and characterization of poly(urethane-benz oxazine)/**clay** hybrid **nanocomposites**
AU Takeichi, Tsutomu; Guo, Yong
CS School of Materials Science, Toyohashi University of Technology, Toyohashi, 441-8580, Japan
SO Journal of Applied Polymer Science (2003), 90(14), 4075-4083
CODEN: JAPNAB; ISSN: 0021-8995
PB John Wiley & Sons, Inc.
DT Journal
LA English
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 37, 73
AB Poly(urethane-benz oxazine)/**clay** hybrid **nanocomposites** (PU/Pa-OMMT) were prepared from an in situ copolymn. of a polyurethane (PU) prepolymer and a monofunctional benz oxazine monomer, 3-phenyl-3,4-dihydro-2H-1,3-benz oxazine (Pa), in the presence of an organophilic **montmorillonite** (OMMT), by solvent method using DMAc. OMMT was made from **cation**-exchange of Na-**montmorillonite** with dodecyl ammonium chloride. The formation of the exfoliated **nanocomposites** structures of PU/Pa-OMMT was confirmed by XRD from the disappearance on the peak due to the basal diffraction of the layer-structured **clay** found in OMMT. DSC showed that, in the presence of OMMT, the curing temperature of PU/Pa lowered by ca. 60°C for the onset and ca. 20°C for the maximum After curing at 190°C for 1 h, the exothermic peak on DSC disappeared. All the obtained films of PU/Pa-OMMT were deep yellow and transparent. As the content of OMMT increased, both the tensile modulus and strength of PU/Pa-OMMT films increased, while the elongation decreased. The characteristics of the PU/Pa-OMMT films changed from plastics to **elastomers** depending on OMMT content and PU/Pa ratio. PU/Pa-OMMT films also exhibited excellent resistance to the solvents such as THF, N,N-dimethylformamide and N-methyl-2-pyrrolidinone. The thermal stability of PU/Pa were enhanced remarkably even with small amount of OMMT.
ST polyurethane benzoxazine **rubber** organo **clay** **nanocomposite** viscoelasticity elastic strength
IT Urethane **rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(benzoxazine-based; poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)
IT Crosslinking
(effect of organophilic modified **clay** on curing of poly(urethane-benzoxazine))
IT Reinforced plastics
RL: PRP (Properties)

(effect of organophilic modified **clay** on decomposition temperature of poly(urethane-benzoxazine))

IT **Clays,** uses
RL: MOA (Modifier or additive use); USES (Uses)
(montmorillonitic; poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

IT Solubility
(organic solvents; poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

IT Elongation at break
Glass transition temperature
Hybrid organic-inorganic materials
Nanocomposites
Optical absorption
Solvent-resistant materials
Storage modulus
Stress-strain relationship
Tensile strength
Young's modulus
(poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

IT Synthetic **rubber,** properties
RL: **POF (Polymer in formulation);** PRP (Properties); USES (Uses)
(polyurethane-, benzoxazine-based; poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

IT Polymer degradation
(thermal; effect of organophilic modified **clay** on decomposition temperature of poly(urethane-benzoxazine))

IT 929-73-7D, Dodecyl ammonium chloride, **cation**-exchange reaction product with Kunipia F 187247-40-1D, Kunipia F, **cation** -exchange reaction product with dodecyl ammonium chloride
RL: MOA (Modifier or additive use); USES (Uses)
(filler; poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

IT 350809-92-6
RL: **POF (Polymer in formulation);** PRP (Properties); USES (Uses)
(**rubber;** poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

IT 67-66-3, Chloroform, uses 67-68-5, Dimethylsulfoxide, uses 68-12-2, Dimethylformamide, uses 109-99-9, uses 120-94-5, N-Methyl pyrrolidine 127-19-5, N,N-Dimethylacetamide
RL: NUU (Other use, unclassified); USES (Uses)
(solvent; solvent resistance of poly(urethane-benzoxazine) **clay** hybrid **nanocomposites**)

RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L75 ANSWER 18 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 5
AN 2003:421630 HCAPLUS
DN 139:198654
ED Entered STN: 03 Jun 2003
TI Melt compounded epoxidized natural **rubber**/layered silicate **nanocomposites**: structure-properties relationships
AU Varghese, S.; Karger-Kocsis, J.; Gatos, K. G.
CS Institute for Composite Materials, Department of Materials Science, Kaiserslautern University of Technology, Kaiserslautern, D-67663, Germany
SO Polymer (2003), 44(14), 3977-3983
CODEN: POLMAG; ISSN: 0032-3861
PB Elsevier Science Ltd.
DT Journal
LA English
CC 39-12 (Synthetic Elastomers and Natural **Rubber**)
AB Epoxidized natural **rubber** (ENR)-layered silicate composites were produced by melt compounding and sulfur curing. Pristine (sodium **bentonite** and sodium fluorohectorite) and organophilic modified silicates (organoclays with primary amine and **quaternary** ammonium modifications) were introduced in 10 parts per hundred **rubber** (phr) in the recipes and their effect on the curing and (thermo)mech. properties determined The dispersion state of the silicates was studied by X-ray diffraction and transmission electron microscopy. Fastest curing and best mech. properties were found for the ENR containing the organoclay with primary amine modification. This organoclay was partly exfoliated, partly intercalated and partly confined (reaggregated). Due to the high shearing during compounding the pristine fluorohectorite was also intercalated by ENR. The complex dispersion state of the layered silicates was well reflected in the glass transition relaxation, which showed multiple peaks. Intercalation/exfoliation of the silicates were best displayed in stiffness- and strength-related mech. parameters.

ST   epoxidized natural **rubber** layered silicate **nanocomposite**
     structure property relationship
IT   Natural **rubber**, properties
     RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
        (epoxidized; structure-properties relationships of melt compounded
        epoxidized natural **rubber**/layered silicate
        nanocomposites)
IT   **Bentonite**, properties
     RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
        (sodian; structure-properties relationships of melt compounded
        epoxidized natural **rubber**/layered silicate
        nanocomposites)
IT   Elongation, mechanical
     Hardness (mechanical)
     Mechanical loss
     Mechanical properties
     Molecular structure-property relationship
       Nanocomposites
     Storage modulus
     Tensile strength
        (structure-properties relationships of melt compounded epoxidized
        natural **rubber**/layered silicate **nanocomposites**)
IT   Strength
        (tearing; structure-properties relationships of melt compounded
        epoxidized natural **rubber**/layered silicate
        nanocomposites)
IT   182636-27-7, Somasif ME100   309295-00-9, Cloisite 30B   402944-35-8,
     Nanomer I.30P
     RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
        (structure-properties relationships of melt compounded epoxidized
        natural **rubber**/layered silicate **nanocomposites**)
RE.CNT 19   THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(10) Mousa, A; Macromol Mater Engng 2001, V286, P260 HCAPLUS
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L75 ANSWER 19 OF 59 COMPENDEX COPYRIGHT 2004 EEI on STN
AN   2003(45):8938 COMPENDEX
TI   Preparation, Characterization, and **Nanostructural** Evolution of
     Epoxy **Nanocomposites**.
AU   Chen, Chenggang (Univ. of Dayton Research Institute, Dayton, OH

45469-0168, United States); Curliss, David
SO   Journal of Applied Polymer Science v 90 n 8 Nov 21 2003 2003.p 2276-2287
CODEN: JAPNAB   ISSN: 0021-8995
PY   2003
DT   Journal
TC   Experimental
LA   English
AB   Epoxy **nanocomposites** were prepared from the different organoclays with aerospace epoxy resin. A series of organoclays treated with alkylammonium chloride with different alkyl groups of different carbon chains were prepared, including SC4, SC6, SC8, SC10, SC12, SC16, SC18, and NC8, NC12, NC18. All of these organoclays, except for SC4, are very compatible with the aerospace Epon 862/ curing agent W. The characterization from wide-angle X-ray diffraction (WAXD), small-angle X-ray scattering (SAXS), and transmission electron microscopy (TEM) confirms the exfoliated **nanostructure.** The six-carbon chain length of the ammonium **cation** is enough to wet the surface of the **clay** gallery to make the organoclay compatible with epoxy resin. The **clay** with lower **cation** exchange capacity is more favorable for the polymer penetration inside the gallery and is dispersed better in the polymer matrix. The structural evolution of the aerospace epoxy **nanocomposite** was monitored by in situ SAXS. The 3% SC18/Epon 862/W, 3 and 6% SC8/Epon 862/W showed exfoliated **nanostructure**, while there is no exfoliation taking place for 3% S30B/Epon 862/W and 3%S25A/Epon 862/W up to 200deg C The acidity from the pendent group in SC18 and SC8 has a catalytic effect for the polymerization inside the gallery, while the organic pendent group of S30B and S25A does not. The faster reaction of the intragallery epoxy resin produced extra thermal heat inside the gallery to expand the gallery and is favorable for the migration of epoxy resin outside the gallery into the gallery where exfoliation took place. The exothermal heat of curing inside the gallery is an important factor for **nanosheets** exfoliation. Although exfoliation took place for both 3% SC18/Epon 862/W and 3% SC8/Epon 862/W, the detailed morphology development during the curing is different. For 3% SC8/Epon 862/W, the interplanar spacing between the layers is increased gradually, while 3% SC18/Epon 862/W experienced the disappearance of the ordered structure of the layered silicate in the beginning of the curing process and reappearance of the ordered structure of the silicate later. The glassy and **rubbery** moduli of the polymer-silicate **nanocomposites** were found to be greater than the unmodified resin because of the high aspect ratio and high stiffness of the layered silicate filler. $CPY 2003 Wiley Periodicals, Inc. 30 Refs.
CC   815.1.1 Organic Polymers; 933.1 Crystalline Solids; 483.1 Soils and Soil Mechanics; 931.2 Physical Properties of Gases, Liquids and Solids; 421 Strength of Building Materials. Mechanical Properties
CT   *Epoxy resins; **Nanostructured** materials; Stiffness; **Clay** ; Morphology
ST   **Cation** exchange capacity
ET   W; B*S; S30B; S cp; cp; B cp

L75 ANSWER 20 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN   2004:103488 HCAPLUS
ED   Entered STN: 09 Feb 2004
TI   **Rubber nanocomposites** via solution and melt intercalation
AU   Varghese, Siby; Karger-Kocsis, J.; Pannikottu, Abraham
CS   Rubber Research Institute of India, Kerala, India
SO   Technical Papers - American Chemical Society, Rubber Division, [Fall

Technical Program], 164th, Cleveland, OH, United States, Oct. 14-17, 2003 (2003), 2148-2172 Publisher: American Chemical Society, Rubber Division, Akron, Ohio.
CODEN: 69EZYK; ISSN: 1547-1969
DT Conference; (computer optical disk)
LA English
CC 39 (Synthetic Elastomers and Natural **Rubber**)
AB A brief review was given on the production and structure/property relationships in **rubbers** reinforced by layered silicates. Natural **rubber** (NR) based **nanocomposites** from **latex** with 10-wt% natural (sodium **bentonite**) and synthetic (sodium fluorohectorite) layered silicate were produced by compounding the dispersions of **clays** and other **latex** chems. necessary for vulcanisation. The solid epoxidised natural **rubber** (ENR-50) layered silicate **nanocomposite** was prepared by melt compounding followed by accelerated sulfur curing. For these sodium **bentonite** and sodium fluorohectorite and organoclays with primary and **quaternary** amine modifications were selected. In the case of **nanocomposites** from NR **latex**, layered silicates recorded the maximum properties compared to the reference material (English India **clay**) in all aspects. This was attributed to the intercalation/exfoliation of the silicates and to the formation of a skeleton (house of cards) silicate network in the NR matrix. Fastest curing and best mech. properties were found for the ENR containing the organoclay with primary amine modification. This organoclay was partly exfoliated, partly intercalated and partly confined (reaggregated). The dispersion state of the silicates was studied by X-ray diffraction and transmission electron microscopy. Intercalation/exfoliation of the silicates were best displayed in stiffness and strength related mech. parameters. Based on the present findings some tendencies for the future were deduced and discussed.
RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(4) Ganter, M; RUBBER CHEM TECHNOL 2001, V74, P221 HCAPLUS
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L75 ANSWER 21 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:684328 HCAPLUS
DN 139:308729
ED Entered STN: 02 Sep 2003
TI Structure and thermoelastic behavior of synthetic **rubber** /organoclay **nanocomposites**
AU Privalko, Valery P.; Ponomarenko, Sergiy M.; Privalko, Eleonora G.; Schoen, Frank; Gronski, Wolfram; Staneva, Rosina; Stuehn, Bernd
CS Institute of Macromolecular Chemistry, National Academy of Sciences of Ukraine, Kiev, 02160, Ukraine
SO Macromolecular Chemistry and Physics (2003), 204(12), 1480-1485
CODEN: MCHPES; ISSN: 1022-1352
PB Wiley-VCH Verlag GmbH & Co. KGaA
DT Journal
LA English
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 37
AB **Nanocomposites** of synthetic styrene-co-butadiene **rubber** and three types of organoclay fillers were prepared by melt-compounding and characterized by small-angle X-ray scattering (SAXS), differential calorimetry and stretching calorimetry. The in-**rubber** structure of the organoclay **particles** is characterized by different degrees of intercalation with interlayer distances ranging from 3.1-4.8 nm. In contrast to the pristine **rubber**, all **nanocomposites** exhibited irreversibility of both mech. work and heat effects in stretching/contraction cycles at fairly low elongations. Moreover, at the same filler loading both the mech. reinforcement effect and the magnitude of sp. heat effects proved strongly dependent on the degree of intercalation. In the range of low elongations, significantly earlier onsets of the heat inversion phenomenon (compared to theor. expected), as well as the overshoots of exothermal heat effects in contraction above the endothermal heat effects in stretching for **nanocomposites**, suggested the contribution of structural rearrangements at the **rubber**/filler interface by the mechanism of chain slippage operative in both stretching and contraction regimes. In the range of high elongations, the thermoelastic behavior of **nanocomposites** could be accounted for quant. by the model, which assumed explicitly the contributions of local strain amplification for the **rubber** matrix and of successive decay of **nanoparticle** clusters with increasing strain, generating the exothermal effects of external friction between **nanoparticles**.
ST **styrene butadiene rubber** organoclay **nanocomposite** thermoelastic property
IT **Clays**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**cation**-modified; structure and thermoelastic behavior of synthetic **rubber**/organoclay **nanocomposites**)
IT Thermal expansion
(coefficient; of synthetic **rubber**/organoclay **nanocomposites**)
IT Crystal structure
Heat capacity
Young's modulus
(of synthetic **rubber**/organoclay **nanocomposites**)
IT Elongation, mechanical
Simulation and Modeling, physicochemical

(of thermoelastic behavior of synthetic **rubber**/organoclay **nanocomposites**)
IT Work (mechanical)
(specific; of synthetic **rubber**/organoclay **nanocomposites**)
IT **Nanocomposites**
(structure and thermoelastic behavior of synthetic **rubber** /organoclay **nanocomposites**)
IT **Styrene-butadiene rubber,** properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(structure and thermoelastic behavior of synthetic **rubber** /organoclay **nanocomposites**)
IT 483297-86-5, **Nanomer** I 42E
RL: MOA (Modifier or additive use); USES (Uses)
(**Nanofil**; structure and thermoelastic behavior of synthetic **rubber**/organoclay **nanocomposites**)
IT 612491-65-3D, protonated, reaction products with **clay**
RL: MOA (Modifier or additive use); USES (Uses)
(structure and thermoelastic behavior of synthetic **rubber** /organoclay **nanocomposites**)
IT **9003-55-8**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(**styrene-butadiene rubber,** structure and thermoelastic behavior of synthetic **rubber**/organoclay **nanocomposites**)
RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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L75 ANSWER 22 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:572041 HCAPLUS
DN 139:338906
ED Entered STN: 27 Jul 2003
TI Structure and properties of natural **rubber** and modified **montmorillonite nanocomposites**

AU Magaraphan, Rathanawan; Thaijaroen, Woothichai; Lim-Ochakun, Ratree
CS The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, 10330, Thailand
SO Rubber Chemistry and Technology (2003), 76(2), 406-418
CODEN: RCTEA4; ISSN: 0035-9475
PB American Chemical Society, Rubber Division
DT Journal
LA English
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 37
AB **Montmorillonite clay** was organically modified by primary and **quaternary** ammonium salts (having C12-C18). The modified **clay** was added to a solution of natural **rubber** in toluene at various contents. Characterization of the structure of the **nanocomposites** was performed by using x-ray diffraction and transmission electron microscope. The results showed that the silicate layers of the **clay** were expanded so that the exfoliated **nanocomposites** were obtained at **clay** content below 10 weight% above that the **nanocomposites** became partially exfoliated. Moreover, long primary amine showed more improved mech. properties than the **quaternary** one (at the same carbon nos.). The longer organic modifying agents resulted in better expansion of silicate layer distance indicating more intercalation of natural **rubber** mols. in between **clay** galleries. The curing properties were also improved. It was found that a small loading of 7 weight% is enough to bring good mech. properties in comparison to those of high structure silica filled and carbon black filled natural **rubber** vulcanizates.
ST natural **rubber montmorillonite** alkylamine ion exchange **nanocomposite** tensile strength

IT Natural **rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(STR 5L; natural **rubber** and modified **montmorillonite nanocomposites**)

IT Polymer morphology
(micromorphol.; mol. intercalation for organically modified **montmorillonite** of natural **rubber nanocomposites**)

IT Intercalation
(mol. intercalation for organically modified **montmorillonite** of natural **rubber nanocomposites**)

IT **Clays**, preparation
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(montmorillonitic, fillers; natural **rubber** and organically modified **montmorillonite nanocomposites**)

IT **Nanocomposites**
(natural **rubber** and modified **montmorillonite nanocomposites**)

IT Elongation at break
Fillers
Hardness (mechanical)
Ion exchange
Tensile strength
Vulcanization
Young's modulus
(natural **rubber** and organically modified **montmorillonite nanocomposites**)

IT Reinforced plastics

RL: PRP (Properties)
(natural **rubber** and organically modified **montmorillonite nanocomposites**)

IT **57-09-0DP,** Hexadecyltrimethyl ammonium bromide, reaction product with sodium exchanged **montmorillonite** 112-03-8DP, Octadecyltrimethyl ammonium chloride, reaction product with sodium exchanged **montmorillonite** 124-22-1DP, Dodecylamine, reaction product with sodium exchanged **montmorillonite** 124-30-1DP, Octadecylamine, reaction product with sodium exchanged **montmorillonite** 143-27-1DP, Hexadecylamine, reaction product with sodium exchanged **montmorillonite 1318-93-0DP, Montmorillonite,** sodium exchanged, reaction products with alkylamine 2016-42-4DP, Tetradecylamine, reaction product with sodium exchanged **montmorillonite**
RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(filler; natural **rubber** and organically modified **montmorillonite nanocomposites**)

RE.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L75 ANSWER 23 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:234204 HCAPLUS
DN 139:23124
ED Entered STN: 26 Mar 2003
TI Effect of organomontmorillonite modified with different intercalants on properties of EPDM/**clay nanocomposites**
AU Zheng, Hua; Zhang, Yinxi; Zhang, Yong; Peng, Zonglin
CS Research Institute of Polymer Materials, Shanghai Jiaotong University, Shanghai, 200240, Peop. Rep. China
SO Hecheng Xiangjiao Gongye (2003), 26(2), 115
CODEN: HXGOEA; ISSN: 1000-1255

PB   Hecheng Xiangjiao Gongye Zazhi Bianjibu
DT   Journal
LA   English
CC   39-9 (Synthetic Elastomers and Natural **Rubber**)
     Section cross-reference(s): 46, 57
AB   The effect of organomontmorillonite (OMMT) modified with three
     intercalants: octadecyl tri-Me ammonium chloride (DK1),
     bis(2-hydroxyethyl) Me dodecyl ammonium chloride (DK2) and octadecyl di-Me
     benzylammonium chloride (DK5) on the mech. properties and the dynamic
     mech. properties of the EPDM/OMMT **nano** composites were studied.
     Among the blends with the three OMMT, the EPDM/DK2 had the best
     properties. This may be caused by the interaction between the hydroxyethyl
     of DK2 and the oxygen of the OMMT.
ST   EPDM **rubber** organomontmorillonite **nanocomposite**
     surfactant modified
IT   Surfactants
        (**cationic**; effect of organomontmorillonite modified with
        surface active intercalants on properties of EPDM/**clay**
        nanocomposites)
IT   Elongation at break
       Nanocomposites
     Polymer morphology
     Storage modulus
     Tensile strength
        (effect of organomontmorillonite modified with surface active
        intercalants on properties of EPDM/**clay**
        nanocomposites)
IT   EPDM **rubber**
     RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
        (effect of organomontmorillonite modified with surface active
        intercalants on properties of EPDM/**clay**
        nanocomposites)
IT   **Clays**, properties
     RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
        (montmorillonitic; effect of organomontmorillonite modified with
        surface active intercalants on properties of EPDM/**clay**
        nanocomposites)
IT   Complex modulus
        (tan δ; effect of organomontmorillonite modified with surface
        active intercalants on properties of EPDM/**clay**
        nanocomposites)
IT   Strength
        (tearing; effect of organomontmorillonite modified with surface active
        intercalants on properties of EPDM/**clay**
        nanocomposites)
IT   112-03-8, Octadecyl trimethyl ammonium chloride   122-19-0, Octadecyl
     dimethyl benzylammonium chloride   22340-01-8, Bis(2-hydroxyethyl) methyl
     dodecyl ammonium chloride
     RL: MOA (Modifier or additive use); USES (Uses)
        (**cationic** surfactant; effect of organomontmorillonite
        modified with surface active intercalants on properties of EPDM/
        clay nanocomposites)
RE.CNT 2   THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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(2) Young, W; Polym Int 2002, V51, P319

L75 ANSWER 24 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 2003:353509 HCAPLUS
DN 140:112056
ED Entered STN: 09 May 2003
TI Mechanical properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**
AU Zhan, Mao-sheng; Xiao, Wei; Li, Zhi
CS School of Materials Sciences and Engineering, Beijing University of Aeronautics and Astronautics, Beijing, 100083, Peop. Rep. China
SO Hangkong Cailiao Xuebao (2003), 23(1), 34-43
CODEN: HCXUFZ; ISSN: 1005-5053
PB Hangkong Cailiao Xuebao Bianjibu
DT Journal
LA Chinese
CC 37-5 (Plastics Manufacture and Processing)
Section cross-reference(s): **39**

AB Three kinds of montmorillonites (MMT, including S-MMT, TG-2, OLS) and one kind of short-cut glass fiber (SGF) were used to melt compounded with phenolic resin (PF), thus phenolic resin matrix composites were prepared Notch impacting and bending tests were used to study the mech. properties and strengthening and toughening mechanism, through which some regular results were achieved. Notch impact strength, bending modulus and strength of PF/NBR/SGF composites increase with the increase of the content of SGF. For PF/NBR matrix **montmorillonite nanocomposites**, notch impact strength increase with the increase of the contents of the montmorillonites, when the content of montmorillonites reaches 5 phr, the impact strength is the highest; and the bending modulus and bending strength also increase with the increases of the contents of the montmorillonites, and when the content is up to 9 phr, the bending modulus and bending strength are the highest. Through the comparison of the mech. properties of the PF/NBR matrix composites, it showed that: when the content of the fillers and the exptl. temperature is the same, the notch impact strength of PF/NBR/SGF composite is the highest, but the bending modulus and bending strength are the lowest; the notch impact strength of PF/NBR/OLS **nanocomposites** is the second one, but their bending modulus and bending strength are the highest; the notch impact strength of PF/NBR/TG-2 **nanocomposites** is the third one, and their bending strength and bending modulus are the second one; the notch impact strength of PF/NBR/S-MMT **nanocomposites** is the lowest, and the bending modulus and bending strength is the third one. Secondly, for each of the PF/NBR matrix composites, when the exptl. temperature is 60°C, their impact strength are the highest; when exptl. temperature is higher or lower than 60°C, their impact strength lowered. For PF/NBR/OLS, PF/NBR/TG-2 and PF/NBR/S-MMT **nanocomposites**, their mech. properties have close relation with the space distances of montmorillonites, the greater the space distances of montmorillonites are, the better the mech. properties world be. When the content of **montmorillonite** is the same, the mech. properties of the exfoliated **nanocomposites** are better than intercalated **nanocomposite**. At last, **montmorillonite**'s toughening and strengthening mechanism was studied, and models illustrated in Fig. 10 and Fig. 11 are proposed.
ST phenolic resin NBR **rubber** glass fiber **montmorillonite nanocomposite**; mech property phenolic resin NBR **rubber nanocomposite**
IT Exfoliation
Intercalation
(effect on mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

IT Reinforced plastics
RL: PRP (Properties)
(glass fiber-reinforced; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT Bending strength
Flexural modulus
Impact strength
Nanocomposites
Storage modulus
Vulcanization
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT Nitrile **rubber**, properties
Phenolic resins, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT Glass fibers, uses
RL: MOA (Modifier or additive use); USES (Uses)
(short-cut, surface modified with KH-550; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT Complex modulus
(tan δ; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT **1318-93-0, Montmorillonite**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(S-MMT; mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT **57-09-0D**, Hexadecyltrimethylammonium bromide, reaction products with **montmorillonite** 919-30-2D, KH 550, reaction products with short-cut glass fiber 647030-37-3, TG 2 647030-38-4, OLS
RL: MOA (Modifier or additive use); USES (Uses)
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT 647029-71-8, PF 8001
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)
IT 9003-18-3
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(nitrile **rubber**, mech. properties, strengthening and toughening mechanism of PF/NBR matrix **montmorillonite nanocomposites**)

L75 ANSWER 25 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2002:384386 HCAPLUS
DN 136:370868
ED Entered STN: 23 May 2002
TI Polymer **nanocomposite** materials and their production method
IN Kuo, Wen-Fa; Wu, Chen-Yu; Li, Mao-Sung; Li, Shih-Yang
PA Industrial Technology Research Institute, Taiwan
SO Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08L101-00

ICS B82B001-00; C08J003-215; C08K003-00; C08L101-00; C08L039-00
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002146211	A2	20020522	JP 2001-160624	20010529
	US 2002086932	A1	20020704	US 2001-859394	20010518
	US 6710111	B2	20040323		
PRAI	TW 2000-89122542	A	20001026		

AB Title materials comprise polymer matrix 60-99, layered inorg. materials which cover the polymer matrix homogeneously 0.5-30, and polyelectrolytes with charges opposite to the inorg. materials adsorbed on the inorg. materials 0.5-30%. Thus, 100 g **water** dispersion solution containing 0.40 g Kunipia F and 0.37 g poly(diallyldimethylammonium chloride) was added in 50 g 2.35% **styrene-butadiene latex** solution and centrifuged to give a **clay**/polyelectrolyte/**SBR** **nanocomposite** with interlayer distance 22.07 Å and peak intensity 2.39 kcps at 4.00° (2θ).

ST **nanocomposite clay** polyelectrolyte **styrene** **butadiene rubber** prepn

IT Polyelectrolytes
(**cationic**; preparation of **nanocomposite** materials comprising)

IT Mica-group minerals, uses
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fluorine-rich; preparation of **nanocomposite** materials comprising)

IT **Clay** minerals
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(layered; preparation of **nanocomposite** materials comprising)

IT **Nanocomposites**
(preparation of **nanocomposite** materials)

IT Polyelectrolytes
(preparation of **nanocomposite** materials comprising)

IT Butadiene **rubber**, uses
Isoprene **rubber**, uses
Natural **rubber**, uses
Nitrile **rubber**, uses
Polyurethanes, uses
Styrene-butadiene rubber, uses
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(preparation of **nanocomposite** materials comprising)

IT **Clays**, uses
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(smectitic; preparation of **nanocomposite** materials comprising)

IT 9003-17-2
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(butadiene **rubber**, preparation of **nanocomposite**

materials comprising)
IT 9003-31-0
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(isoprene **rubber**, preparation of **nanocomposite** materials comprising)
IT 9003-18-3
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(nitrile **rubber**, preparation of **nanocomposite** materials comprising)
IT 25232-41-1, Poly(4-vinylpyridine) 26062-79-3, Poly(diallyldimethylammonium chloride)
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(polyelectrolyte; preparation of **nanocomposite** materials comprising)
IT 1318-00-9, Vermiculite **1318-93-0, Montmorillonite,** uses 1319-41-1, Saponite 12068-50-7, Halloysite **12172-85-9, Beidellite 12173-47-6, Hectorite** 12174-06-0, Nontronite 12174-53-7, Sericite 12417-86-6, Stevensite 187247-40-1, Kunipia F
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(preparation of **nanocomposite** materials comprising)
IT 9002-86-2, PVC 9003-53-6, Polystyrene 9011-14-7, Methyl methacrylate homopolymer
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(preparation of **nanocomposite** materials comprising)
IT **9003-55-8**
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**styrene-butadiene rubber**, preparation of **nanocomposite** materials comprising)

L75 ANSWER 26 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:980379 HCAPLUS
DN 140:5762
ED Entered STN: 17 Dec 2003
TI Phenolic resin/**clay nanocomposite** and its preparation
IN Zhao, Tong; Zhi, Linjie; Wang, Hongsheng; Yang, Mingshu
PA Institute of Chemistry, Chinese Academy of Sciences, Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 9 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
IC ICM C08L061-06
ICS C08K007-00
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1361201	A	20020731	CN 2000-136178	20001227
	CN 1117814	B	20030813		
PRAI	CN 2000-136178		20001227		

AB A phenolic resin/**clay nanocomposite**, in which the **clay** can be peeled off, is obtained by first dispersing **clay**, such as **montmorillonite**, into monomers of a thermoplastic phenolic resin, and then polymerizing the monomers in the presence of an acidic catalyst, such as toluene sulfonic acid; the above **nanocomposite** can be further mixed with resin or **rubber**, such as epoxy resin, phenolic resin, PE, PET, PMMA, butadiene-styrene **rubber**, and ethylene-propylene **rubber**. Thus, **cation**-exchanged **montmorillonite**, phenol, formaldehyde were mixed to receive a colloid system, followed by addition of oxalic acid and polymerizing at 95° for 4 h to receive a phenolic resin/**clay nanocomposite**, which could be further mixed with polyethylene.

ST phenol formaldehyde copolymer phenolic resin polyethylene **clay montmorillonite nanocomposite**

IT Silicates, uses
RL: MOA (Modifier or additive use); USES (Uses)
(layered, **nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)

IT Epoxy resins, uses
Ethylene-propylene **rubber**
Phenolic resins, uses
Polyamides, uses
Polyesters, uses
Styrene-butadiene rubber, uses
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(**nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)

IT **Nanocomposites**
(phenolic resin/**clay nanocomposite** and its preparation)

IT **Clays**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(phenolic resin/**clay nanocomposite** and its preparation)

IT 9010-79-1
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(ethylene-propylene **rubber**, **nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)

IT 9003-35-4P, Formaldehyde-phenol copolymer
RL: CPS (Chemical process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(**nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)

IT **1318-93-0, Montmorillonite**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)

IT 9002-86-2, Poly(vinyl chloride) 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, Polystyrene 9011-14-7, Poly(methyl methacrylate) 25014-41-9, Polyacrylonitrile 25038-54-4, Nylon 6, uses 25038-59-9, PET polymer, uses 32131-17-2, Nylon 66, uses

RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(**nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)
IT 104-15-4, Toluene sulfonic acid, uses 144-62-7, Oxalic acid, uses 7647-01-0, Hydrochloric acid, uses 13598-36-2, Phosphonic acid
RL: CAT (Catalyst use); USES (Uses)
(phenolic resin/**clay nanocomposite** and its preparation)
IT 108066-37-1, Epoxy 618
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(phenolic resin/**clay nanocomposite** and its preparation)
IT **9003-55-8**
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(**styrene-butadiene rubber**, **nanocomposite**; phenolic resin/**clay nanocomposite** and its preparation)

L75 ANSWER 27 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:730587 HCAPLUS
DN 139:215273
ED Entered STN: 18 Sep 2003
TI **Nanoscale** composite materials containing layered inorganic **clays** and polyelectrolytes and a method for preparation thereof
IN Guo, Wenfa; Wu, Zhenyu; Li, Maosong; Li, Shiyang
PA Research Institute of Industrial Technology, Consortium, Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 31 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
IC ICM C08L009-08
ICS C08K003-34
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1357565	A	20020710	CN 2000-134026	20001207
	CN 1121442	B	20030917		
PRAI	CN 2000-134026		20001207		

AB The composites comprise 60-90% base polymer (A), 0.5-30% layered inorg. **clays** (B) dispersed in A, and 0.5-30% polyelectrolytes (C) having opposite elec. charge with B, wherein A is selected from **styrene-butadiene rubber**, isoprene **rubber**, butadiene **rubber**, nitrile **rubber**, natural **rubber**, PVC, polystyrene, PMMA, polyurethane or mixture thereof. Thus, dispersing 5 g **montmorillonite clay** (Kunipia F) in 100 g **water** and mixing with 2% a **cationic** polyelectrolyte gave an **aqueous** mixture solution, which was further mixed with **styrene-butadiene rubber latex** in a desired ratio, centrifugalized, washed and dried to give a title composite material.
ST **styrene butadiene latex** polyelectrolyte **nanoscale** composite material prepn; layered inorg **montmorillonite clay nanoscale** composite material prepn
IT Polyelectrolytes

(**cationic**; in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Nanocomposites**
(containing layered inorg. **clays** and polyelectrolytes and prepns. thereof)

IT **Styrene-butadiene rubber**, properties
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT Butadiene **rubber**, properties
Isoprene **rubber**, properties
Natural **rubber**, properties
Nitrile **rubber**, properties
Polyurethanes, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Clays**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(montmorillonitic, layered **clay**; in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **Clays**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(smectitic, layered **clay**; in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-17-2
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(butadiene **rubber**, in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9002-86-2, PVC 9003-53-6, Polystyrene 9011-14-7, Poly(methyl methacrylate)
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-31-0
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(isoprene **rubber**, in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 1318-00-9, Vermiculite 1319-41-1, Saponite 12068-50-7, Shinshu Kaolin **12172-85-9, Beidellite 12173-47-6, Hectorite** 12174-06-0, Nontronite 12174-53-7, Sericite 12417-86-6, Stevensite 187247-40-1, Kunipia F
RL: MOA (Modifier or additive use); USES (Uses)
(layered **clay**; in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-18-3
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(nitrile **rubber**, in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT 9003-47-8, Poly(vinylpyridine) 26062-79-3, Poly(diallyldimethylammonium chloride)
RL: MOA (Modifier or additive use); USES (Uses)
(polyelectrolyte; in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

IT **9003-55-8**
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**styrene-butadiene rubber**, in prepns. of composite materials containing layered inorg. **clays** and polyelectrolytes)

L75 ANSWER 28 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:178248 HCAPLUS
DN 138:171582
ED Entered STN: 11 Mar 2003
TI Preparation of layered **nanoscale** composites from graft silicone **rubber** and **clay**
IN Zhou, Ninglin
PA Nanjing Normal Univ., Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 13 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
IC ICM C08L083-04
ICS C08K003-34
CC 39-7 (Synthetic Elastomers and Natural **Rubber**)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1336397	A	20020220	CN 2001-127115	20010817
PRAI	CN 2001-127115		20010817		

AB The composites have improved mech. properties and oil-resistance and are prepared from grafted silicone **rubber** 100, **clay** 0.5-2, **cationic** surfactant 0.4-2, dispersing medium 20-100, crosslinking agent 1-10, and promoter 0.1-1 parts. Thus, reacting 100 g polydimethylsiloxane-Me methacrylate graft **rubber** with a mixture of 0.5 g **clay** dispersed in 20 mL **water** and containing 0.4 g [3-(triethoxysilyl)propyl]octadecyldimethylammonium chloride for 5 h and adding 6 g Et silicate and 0.5 g dibutyltin dilaurate, and staying at 35° for 18 h gave a layered composite.
ST polydimethylsiloxane methyl methacrylate grafted **rubber clay** layered composite prepn; silicone **rubber clay** layered **nanoscale** composite prepn
IT Silicone **rubber**, properties
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)
(graft polymers; preparation of layered **nanoscale** composites from graft silicone **rubber** and **clay**)
IT **Nanocomposites**
(preparation of layered **nanoscale** composites from graft silicone **rubber** and **clay**)
IT **Clays**, uses
RL: CPS (Chemical process); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(preparation of layered **nanoscale** composites from graft silicone **rubber** and **clay**)
IT Intercalation compounds
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(preparation of layered **nanoscale** composites from graft silicone

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        rubber and clay)
IT    57-09-0, CTMAB   62117-57-1, Dimethyloctadecyl[3-
      (triethoxysilyl)propyl]ammonium chloride
      RL: NUU (Other use, unclassified); USES (Uses)
         (cationic surfactant; preparation of layered nanoscale
         composites from graft silicone rubber and clay)
IT    497826-55-8
      RL: CPS (Chemical process); PEP (Physical, engineering or chemical
      process); POF (Polymer in formulation); PRP (Properties); PROC
      (Process); USES (Uses)
         (preparation of layered nanoscale composites from graft silicone
         rubber and clay)
IT    161512-62-5, Dimethylsilanediol-methyl methacrylate graft copolymer
      171188-19-5, Butyl acrylate-dimethylsilanediol-methyl methacrylate graft
      copolymer   497826-56-9
      RL: CPS (Chemical process); PEP (Physical, engineering or chemical
      process); POF (Polymer in formulation); PRP (Properties); PROC
      (Process); USES (Uses)
         (rubber; preparation of layered nanoscale composites
         from graft silicone rubber and clay)

L75   ANSWER 29 OF 59  WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN    2003-210081 [20]   WPIX
CR    2003-201329 [19]; 2003-221325 [21]
DNC   C2003-053466
TI    Nanocomposite for tire inner-liner, inner-tube,
      comprises clay and halogenated elastomer comprising
      iso-olefin derived units and amine-functionalized monomer unit.
DC    A18 A25 A95
IN    CHUNG, D Y; DIAS, A J; GONG, C; TSOU, A H; WENG, W
PA    (ESSO) EXXONMOBIL CHEM PATENTS INC
CYC   101
PI    WO 2002100935   A1 20021219 (200320)* EN   62    C08K003-00
         RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
             NL OA PT SD SE SL SZ TR TZ UG ZM ZW
          W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
             DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
             KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT
             RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM
             ZW
      EP 1404749      A1 20040407 (200425)  EN        C08K003-00
          R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
             RO SE SI TR
ADT   WO 2002100935 A1 WO 2002-US16796 20020529; EP 1404749 A1 EP 2002-739471
      20020529, WO 2002-US16796 20020529
FDT   EP 1404749 A1 Based on WO 2002100935
PRAI  US 2001-297915P      20010613; US 2001-296873P      20010608
IC    ICM  C08K003-00
AB    WO2002100935 A UPAB: 20040418
      NOVELTY - Nanocomposite comprises a clay and a
      halogenated elastomer comprising 4-7C iso-olefin derived units
      and amine-functionalized monomer unit.
           DETAILED DESCRIPTION - A nanocomposite comprises a
      clay and a halogenated elastomer comprising 4-7C
      iso-olefin derived units and an amine-functionalized monomer unit of
      formula R-C(E)(R1)-NR2R3R4 (I).
           R, R1 = H, 1-7C alkyl, primary or secondary alkyl halide; and
           R2-R4 = H, (un)substituted 1-20C alkyl, alkene or aryl, 1-20C
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aliphatic alcohols or ethers, 1-20C carboxylic acids, nitriles, ethoxylated amines, acrylates, ester or ammonium ions.
INDEPENDENT CLAIMS are included for the following:
(1) **tire** inner-liner comprising the **nanocomposite**
;
(2) inner-tube comprising the **nanocomposite**; and
(3) method of forming the **nanocomposite** which involves combining **clay** and halogenated **elastomer**.
USE - Useful for air barriers for producing innerliners for motor vehicles, innerliners and innertube for articles such as track **tires**, bus **tires**, passenger automobile, motorcycle **tires**, off the road **tires**.
ADVANTAGE - The **nanocomposite** has improved heat aging resistance. Addition of tertiary amines and polyfunctional curatives improves air permeability of interpolymers.
Dwg.0/0

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FS   CPI
FA   AB; GI
MC   CPI: A08-R06B; A10-E04A; A12-T01

L75  ANSWER 30 OF 59  WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN   2002-698739 [75]   WPIX
DNC  C2002-197932
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TI   Preparation of polymer **nanocomposite** used in paints, automobile **tires**, involves mixing polymer dispersion with **clay** mineral dispersion and adding flocculating agent to resulting **clay** -polymer dispersion mixture.

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DC   A18 A31 E14 E16
IN   KNUDSON, M I; POWELL, C E; POWELL, C
PA   (KNUD-I) KNUDSON M I; (POWE-I) POWELL C E; (SCLA-N) SOUTHERN CLAY PROD INC
CYC  101
PI   WO 2002070589    A2 20020912 (200275)* EN    19    C08J003-215    <--
        RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
            NL OA PT SD SE SL SZ TR TZ UG ZM ZW
         W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
            DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
            KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT
            RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW
     US 2002165305    A1 20021107 (200275)              C08K003-34     <--
     EP 1366109       A2 20031203 (200380)  EN          C08J003-215    <--
         R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
            RO SE SI TR
ADT  WO 2002070589 A2 WO 2002-US6055 20020228; US 2002165305 A1 Provisional US
     2001-273271P 20010302, US 2002-86173 20020228; EP 1366109 A2 EP
     2002-731107 20020228, WO 2002-US6055 20020228
FDT  EP 1366109 A2 Based on WO 2002070589
PRAI US 2001-273271P       20010302; US 2002-86173         20020228
```

IC   ICM **C08J003-215; C08K003-34**

AB   WO 200270589 A UPAB: 20030828
NOVELTY - Producing **nanocomposites** by mixing dispersions of polymers and dispersions of **clay** materials and flocculating to give solid material which exhibit characteristics such as exfoliation of the **clay** mineral platelets.
DETAILED DESCRIPTION - A polymer dispersion is mixed with a **clay** mineral dispersion to form a **clay**-polymer dispersion. A flocculating agent is added to the **clay**-polymer dispersion mixture to form a polymer **nanocomposite**.
An INDEPENDENT CLAIM is included for a polymer **nanocomposite**

USE - For production of polymer **nanocomposite** which is mixed with other materials to produce number of different products or articles such as automobile **tires,** used for forming films, fibers, **rubber** composition and paints.

ADVANTAGE - The flocculated solid material exhibits characteristics of **nanocomposite** such as exfoliation of **clay** mineral platelets. The polymer **nanocomposite** is mixed with other materials to produce number of different products or articles such as automobile **tires.** The **nanocomposite** is added to impart improved performance of the automobile **tire** on ice by minimizing reinforcing performance of a tread **rubber** and improving the traction force by elimination of hydroplaning and increasing area of contact with a road surface. The **nanocomposite** imparts favorable characteristics in production of fibers, or with injection or blow molding, and improves the extrusion of the fibers similar to elimination of melt fractures in commercial films. Injection molding process exhibit improvements in form release and more accurate replication of the molded product to the form. Blow molding processes exhibit improved surface structure features. The produced fiber exhibits increased tensile or flexural strength. A **rubber** composition formed with the **nanocomposites** exhibit excellent hydrophobic and **water** repellence characteristics, and paints formulated with the **nanocomposites** has improved paint characteristics such as minimized sagging, luster, durability, thixotropy and solid suspension.
Dwg.0/0

FS CPI
FA AB; DCN
MC CPI: A07-B01; A12-B01A; A12-T01; E05-G; E05-G03A; E10-A01; E10-A22;
E10-B04; E31-P02D; E31-P05; E33-B; E33-G; E34-B03; E34-D02

L75 ANSWER 31 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2002-463149 [49] WPIX
CR 2002-425907 [45]; 2002-443974 [47]; 2002-499819 [53]; 2002-500841 [53]; 2002-527351 [56]
DNN N2002-365184 DNC C2002-131580
TI Preparation of **aqueous nanocomposite** dispersion used in coatings, sealants, involves polymerizing modified **aqueous clay** dispersion comprising ethylenically unsaturated monomer and exchangeable **cations.**
DC A18 A60 G02 G03 G08 T04
IN LORAH, D P; SLONE, R V
PA (ROHM) ROHM & HAAS CO; (LORA-I) LORAH D P; (SLON-I) SLONE R V
CYC 98
PI WO 2002024759 A2 20020328 (200249)* EN 56 C08F002-44 <--
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
US 2002058740 A1 20020516 (200249) C08K003-34 <--
AU 2001089118 A 20020402 (200252) C08F002-44 <--
EP 1328554 A2 20030723 (200350) EN C08F002-44 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
BR 2001013998 A 20030812 (200367) C08F002-44 <--
CN 1462283 A 20031217 (200420) C08F002-44 <--

JP 2004509986 W 20040402 (200424) 92 C08F002-44 <--
ADT WO 2002024759 A2 WO 2001-US28992 20010917; US 2002058740 A1 Provisional US 2000-234263P 20000921, Provisional US 2000-257041P 20001221, US 2001-954135 20010917; AU 2001089118 A AU 2001-89118 20010917; EP 1328554 A2 EP 2001-968914 20010917, WO 2001-US28992 20010917; BR 2001013998 A BR 2001-13998 20010917, WO 2001-US28992 20010917; CN 1462283 A CN 2001-816053 20010917; JP 2004509986 W WO 2001-US28992 20010917, JP 2002-529167 20010917
FDT AU 2001089118 A Based on WO 2002024759; EP 1328554 A2 Based on WO 2002024759; BR 2001013998 A Based on WO 2002024759; JP 2004509986 W Based on WO 2002024759
PRAI US 2000-257041P 20001221; US 2000-234263P 20000921;
US 2001-954135 20010917
IC ICM **C08F002-44; C08K003-34**
ICS **C08K003-00; C08K009-04**
AB WO 200224759 A UPAB: 20040408

NOVELTY - Ethylenically unsaturated monomer (EUM) (I) and **aqueous clay** dispersion comprising at least partially exfoliated **clay** containing exchangeable **cation** (I) and optionally EUM (II), are combined. **Cation** (II) which exchanges with **cation** (I) to form modified **aqueous clay** dispersion is added, and portion of monomer is polymerized to form **aqueous nanocomposite** dispersion. At least one of monomer comprises polar monomer.

DETAILED DESCRIPTION - Ethylenically unsaturated monomer(s) (I), and **aqueous clay** dispersion comprising an at least partially exfoliated **clay** containing exchangeable **cation** (I) and optionally ethylenically unsaturated monomer(s) (II), are combined. A **cation** (II) which exchanges with at least a portion of **cation** (I) to form a modified **aqueous clay** dispersion is added. At least a portion of monomer is polymerized to form **aqueous nanocomposite** dispersion. At least one of the ethylenically unsaturated monomer comprises a polar monomer.

USE - In coating, adhesive, caulking, sealant, thermoplastic resin and textiles. The coating composition are used as architectural coatings particularly low volatile content application for semigloss and gloss; factory applied coatings (metal and wood, thermoplastic and thermosetting); maintenance coatings (overmetal) automotives coatings; concrete roof file coatings; **elastomeric** roof coatings; **elastomeric** wall coatings; external insulating finishing system; paper or paper board coating; overprint varnishes; fabric coatings and backcoatings; leather coatings; and cementitious roof tile coatings. The dispersion is also useful in opaque polymer and hollow sphere pigments; polish; binders (for nonwovens, paper coatings, pigment printing or inkjet); adhesive (pressure sensitive, flocking adhesives, laminating adhesive, packaging adhesive, hot melted adhesive, reactive adhesive, flexible or rigid industrial adhesive or other **water** basic adhesives); plastic additives; ion exchange resin; hair fixatives; traffic paint; ink composition used for flexographic ink, gravure ink, ink jet ink and pigment printing paste for application on film, sheet, reinforcement plastic composite, paper board, metal foil, fabric, metal, glass and wood; and digital imaging composition used for electrophotography.

ADVANTAGE - The method does not utilize additional polymers or solvent to enhance the affinity between **clay** and polymer at interface and improve overall mechanical property of **nanocomposite**. The enhanced affinity results in increased physical properties such as physical strength. The coating composition containing **nanocomposite** dispersion exhibits improved block, print and dirt

pickup resistance, enhanced barrier properties and enhanced flame retardance, toughness and strength. The coating composition can utilize soft binders without need for solvent for film formation and still maintains sufficient hardness, toughness and lower tack in dried film. The high acid polymer composition with **nanocomposite** dispersion has increased hardness. The **nanocomposite** dispersion imparts high block resistance when used in paint composition, enhanced heat sealed resistance and toughness in ink binder composition. The **nanocomposite** dispersion has resistance to weathering and is inexpensive.

DESCRIPTION OF DRAWING(S) - The figure shows the graphical representation of tensile strength elongation of **aqueous nanocomposite** composition.

Dwg.1/2

FS CPI EPI
FA AB; GI
MC CPI: A08-R01; A10-B01; A12-A05; A12-B01; A12-R08; G02-A02; G03-B02C; G04-B02
EPI: T04-G02C

L75 ANSWER 32 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2002-749472 [81] WPIX
DNN N2002-590170 DNC C2002-212418
TI Polymer **nanocomposite** as engineering plastic, comprises high molecular substrate, layer structured inorganic and polyelectrolyte which carries opposite charge of inorganic material and attached on inorganic material.
DC A18 A25 A92 A95 E19 Q68
IN KUO, W; LEE, M; LEE, S; WU, J
PA (KOGY-N) ZH KOGYO GIJUTSU KENKYUHIN; (INTE-N) IND TECHNOLOGY RES INST
CYC 2

PI	US 2002086932	A1	20020704	(200281)*	20	C08K003-34	<--
	JP 2002146211	A	20020522	(200281)	13	C08L101-00	<--
	US 6710111	B2	20040323	(200421)		C08K003-34	<--

ADT US 2002086932 A1 US 2001-859394 20010518; JP 2002146211 A JP 2001-160624 20010529; US 6710111 B2 US 2001-859394 20010518
PRAI TW 2000-122542 20001026
IC ICM **C08K003-34; C08L101-00**
ICS B82B001-00; **C08J003-215; C08K003-00; C08K011-00**
ICI C08L039:00; C08L101-00
AB US2002086932 A UPAB: 20021216

NOVELTY - The polymer **nanocomposite** comprises high molecular substrate (in weight%) (60-99), layer structured inorganic (0.5-30) well dispersed, coated evenly on the molecular substrate and polyelectrolyte (0.5-30). The polyelectrolyte carries an opposite charge of the layer structured inorganic material and is attached onto the inorganic material.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for the preparation of the polymer **nanocomposite.** A layer structured inorganic solution is combined with a polyelectrolyte solution to obtain a mixture solution. The polyelectrolyte has opposite and greater amount of charges with respect to the layer structured inorganic material. The polyelectrolyte is attached on the layer structured inorganic material. The obtained mixture solution is combined with a polymer **latex,** which carries opposite charges with respect to the polyelectrolyte, by co-agglutination. A layer structured inorganic/polyelectrolyte/polymer **nanocomposite** is obtained.

USE - For vehicle portions and as engineering plastics.

ADVANTAGE - The polymer **nanocomposite** is well-dispersed and is easily obtained by coagulation method. The method produces **nanocomposites** without additional equipment and cost except polyelectrolytes. Use of large amounts of organic solvent are avoided.
Dwg.0/11

FS CPI GMPI
FA AB; DCN
MC CPI: A11-A03; A12-M02; A12-S; A12-T04; E05-T; E10-A22; E31-P; E31-P02; E31-P04; E31-P05

L75 ANSWER 33 OF 59 RAPRA
AN R:882480 RAPRA FS Rapra Abstracts
TI POLYMERIC **NANOCOMPOSITES.** I.
AU Arroyo M; Lopez M A (Instituto de Ciencia y Tecnologia de Polimeros)
SO Revista de Plasticos Modernos 83, No.549, March 2002, p.290-5
ISSN: 0034-8708
CODEN: RPMOAM
PY 2002
DT Journal
LA Spanish
AB Consideration is given to the structure, properties and characterisation of **nanocomposites** consisting of silicate **nanoparticles** dispersed in a polymer matrix. Compatibilisers and coupling agents used in the preparation of such composites are also examined. 22 refs.
CC 51SC1; 59A; 59D; 627; 9; 9T; 9113
SC *OK; MB; MJ; UA; UB; UC
CT ADDITIVE; ADDUCT; AMIDE POLYMER; ANALYSIS; APPLICATION; ASPECT RATIO; AUTOMOTIVE APPLICATION; BLOCK COPOLYMER; CAR; **CATION;** CERAMIC; CHARACTERISATION; CHARACTERIZATION; CHEMICAL PROPERTIES; CHEMICAL RESISTANCE; CHEMICAL RESISTANT; CHEMICAL STRUCTURE; COMPATIBILISER; COMPATIBILIZER; COMPOSITE; COUPLING AGENT; CRYSTALLINITY; CRYSTALLISATION; CRYSTALLIZATION; DATA; DEFLECTION TEMPERATURE UNDER LOAD; DENSITY; DIFFRACTION; DISPERSION; EB; **ELASTOMER;** ELECTRICAL PROPERTIES; ELONGATION AT BREAK; EPOXIDE RESIN; EPOXY RESIN; EXFOLIATED; EXTRUDING; EXTRUSION; FILLER; FLAMMABILITY; FREE VOLUME; GLASS TRANSITION TEMPERATURE; GRAPH; IMPACT PROPERTIES; IMPACT STRENGTH; IN-SITU; INJECTION MOLDING; INJECTION MOULDING; INSTITUTION; INTERCALATED; INTERFACE; ION; ION EXCHANGE; ION-EXCHANGE; LIQUID CRYSTAL POLYMER; MAGNET; MAGNETIC; MAGNETIC PROPERTIES; MATRIX; MECHANICAL PROPERTIES; MEMBRANE; MICROCOMPOSITE; MICROSTRUCTURE; MOLECULAR MOBILITY; MOLECULAR STRUCTURE; **NANOCOMPOSITE; NANOPARTICLE; NANOTUBE;** NYLON; NYLON-6; OPTICAL PROPERTIES; PACKAGING; PARACRYSTALLINE; **PARTICLE SHAPE; PARTICLE SIZE;** PERCOLATION; PHASE SEPARATION; PLASTIC; POLARITY; POLYAMIDE; POLYAMIDE-6; POLYEPOXIDE; POLYPROPENE; POLYPROPYLENE; PP; PROPERTIES; RELAXATION; **RUBBER;** SCANNING ELECTRON MICROSCOPY; SEM; SEMI-CRYSTALLINE; SEMICONDUCTOR; SEMICRYSTALLINE; SOL-GEL; SPHERICAL; STRUCTURE-PROPERTY RELATIONSHIP; SUPERMAGNETIC; SURFACE AREA; TABLES; TEAR STRENGTH; TECHNICAL; TEM; TENSILE PROPERTIES; TG; THERMAL PROPERTIES; THERMAL TRANSITION; THERMOPLASTIC; THERMOSET; TRANSMISSION ELECTRON MICROSCOPY; UNSATURATED POLYESTER; WHISKER; X-RAY DIFFRACTION; X-RAY SCATTERING
NPT ALKYLAMINE; ALKYLAMMONIUM ION; AMINO ACID; **CLAY; HECTORITE; MONTMORILLONITE;** PHYLLOSILICATE; SAPONITE; SILANE; SILICATE
SHR COMPOSITES, plastics, fillers in, properties, molecular structure, analysis, compatibilisers, coupling agents; FILLERS IN, composites, plastics; FILLERS OF, silicates, compatibilisers, coupling agents; COUPLING AGENTS, composites, plastics, fillers; MOLECULAR STRUCTURE,

composites, plastics; COMPATIBILISERS, composites, plastics, fillers; ANALYSIS, composites, plastics
GT EUROPEAN COMMUNITY; EUROPEAN UNION; SPAIN; WESTERN EUROPE

L75 ANSWER 34 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2002:348388 HCAPLUS
DN 137:94995
ED Entered STN: 10 May 2002
TI Study on mechanical property of exfoliated silicone **rubber/ clay nanocomposites**
AU Zhou, Ninglin; Xia, Xiaoxian; Wang, Yanru
CS Department of Chemical Engineering, Nanjing University of Chemical Technology, Nanjing, 210009, Peop. Rep. China
SO Gaofenzi Xuebao (2002), (2), 253-256
CODEN: GAXUE9; ISSN: 1000-3304
PB Kexue Chubanshe
DT Journal
LA Chinese
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
AB A exfoliated silicone **rubber/clay nanocomposite** was prepared from hydroxyl-terminated polydimethylsiloxane and organoclay. HTAB and TPAC were used as swelling agents to treat Na-**montmorillonite** for forming organoclay. The organoclay and **nanocomposite** were confirmed by X-ray diffraction (XRD). The d-spacing in TPAC-mont is 4.96 nm, being larger than that of the HTAB-mont. The mech. properties of the **nanocomposites** have been measured by tensile testing machine. The **nanometer**-scale silicate layers of TPAC-mont were completely exfoliated in silicone **rubber** matrix in the cases of 1% to 10% TPAC-mont content. The **nanocomposites** exhibit markedly improved mech. properties and thermal stability when compared with the pure polymer or conventional aerosilica-filled silicone **rubber.** A 200% .apprx. 300% increase in the tensile strength and a 100% increase in the elongation at break were found for TPAC-mont/silicone **rubber** as compared to that of pure silicone **rubber.** The reinforcing and intercalating mechanism of silicate layers in silicone **rubber** matrix were discussed.
ST silicone **rubber clay nanocomposite** mech
IT Elongation, mechanical
Nanocomposites
Polymer morphology
Tensile strength
(mech. property of exfoliated silicone **rubber/clay nanocomposites**)
IT Silicone **rubber,** properties
RL: **POF (Polymer in formulation);** PRP (Properties); USES (Uses)
(mech. property of exfoliated silicone **rubber/clay nanocomposites**)
IT **57-09-0,** Hexadecyltrimethylammonium bromide   62117-57-1
RL: MOA (Modifier or additive use); USES (Uses)
(mech. property of exfoliated silicone **rubber/clay nanocomposites**)
IT 155827-81-9, Dimethylsiloxanediol-tetraethyl silicate copolymer
RL: **POF (Polymer in formulation);** PRP (Properties); USES (Uses)
(**rubber;** mech. property of exfoliated silicone **rubber /clay nanocomposites**)
IT **1318-93-0, Montmorillonite,** properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)
(sodium-exchanged; mech. property of exfoliated silicone **rubber** /**clay nanocomposites**)

L75 ANSWER 35 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2002:891199 HCAPLUS
DN 138:288832
ED Entered STN: 25 Nov 2002
TI Research on **rubber**/ modified **montmorillonite nanocomposites** - effect of different modification techniques
AU Wang, Lei; Zhou, Yan; Jia, De-min
CS College of Materials Science and Engineering, South China University of Technology, Canton, 510640, Peop. Rep. China
SO Tanxingti (2002), 12(4), 20-23
CODEN: TANXFA; ISSN: 1005-3174
PB Huagongbu Hecheng Xiangjiao Xinxizhan
DT Journal
LA Chinese
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
AB Several different modification techniques were adopted to organize **montmorillonite**, and **rubber**/modified **montmorillonite nanocomposites** were prepared by **rubber latex** co-deposition. The effects of modification techniques on structure and properties of the composites were studied and a new ultrasonic modification was introduced. A cheap, time-saving, high efficiency technique was chosen.
ST **rubber** modified **montmorillonite nanocomposite**
IT Deformation (mechanical)
Elongation at break
Nanocomposites
Polymer morphology
Tensile strength
(effect of modification on **rubber**/ modified **montmorillonite nanocomposites**)
IT Natural **rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(effect of modification on **rubber**/ modified **montmorillonite nanocomposites**)
IT Strength
(tearing; effect of modification on **rubber**/ modified **montmorillonite nanocomposites**)
IT **57-09-0**, Hexadecyltrimethylammonium bromide **1318-93-0**, **Montmorillonite**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(effect of modification on **rubber**/ modified **montmorillonite nanocomposites**)

L75 ANSWER 36 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2001:489537 HCAPLUS
DN 135:93413
ED Entered STN: 06 Jul 2001
TI Thermoplastic olefin **nanocomposites** with **cation** -exchanged layered silicates
IN Chou, Chai-jing; Garcia-Meitin, Eddy I.; Schilhab, Lonnie; Fibiger, Richard F.
PA The Dow Chemical Company, USA
SO PCT Int. Appl., 24 pp.

CODEN: PIXXD2
DT Patent
LA English
IC ICM C08L023-10
ICS C08K009-04; C08L051-06
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001048080	A1	20010705	WO 2000-US34707	20001220
	W: BR, CA, CN, JP, KR, MX, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
	BR 2000016948	A	20020910	BR 2000-16948	20001220
	EP 1268656	A1	20030102	EP 2000-986634	20001220
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
	JP 2003518542	T2	20030610	JP 2001-548611	20001220
PRAI	US 1999-173608P	P	19991229		
	WO 2000-US34707	W	20001220		

AB A thermoplastic olefin **nanocomposite** composition comprises: (a) a maleated polypropylene polymer phase having a weight average mol. weight greater than 100,000; (b) a **cation** exchanging layered silicate material dispersed in the maleated polypropylene phase so that more than one half of the **cation** exchanging layered silicate material is present as one, two, three, four or five layer units upon examination by electron microscopy; and (c) a thermoplastic **elastomer** phase interdispersed with the maleated polypropylene phase.
ST thermoplastic olefin **nanocomposite cation** exchanged layered silicate; maleated polypropylene **nanocomposite**
IT **Quaternary** ammonium compounds, uses
RL: MOA (Modifier or additive use); USES (Uses)
(bis(hydrogenated tallow alkyl)dimethyl, reaction products with **montmorillonite;** thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)
IT Polyolefin **rubber**
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(ethylene-octene; thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)
IT Silicates, uses
RL: MOA (Modifier or additive use); USES (Uses)
(layered, **cation** exchanging; thermoplastic olefin **nanocomposites** with **cation**-exchanged layered silicates)
IT Impact-resistant materials
Nanocomposites
(thermoplastic olefin **nanocomposites** with **cation** -exchanged layered silicates)
IT Thermoplastic **rubber**
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(thermoplastic olefin **nanocomposites** with **cation** -exchanged layered silicates)
IT **1318-93-0D, Montmorillonite,** reaction products with di-Me, dihydrogenated tallow **quaternary** ammonium compds.

RL: MOA (Modifier or additive use); USES (Uses)
(thermoplastic olefin **nanocomposites** with **cation** -exchanged layered silicates)

IT 9003-07-0D, Polypropylene, maleated 26221-73-8, AFFINITY 8180
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(thermoplastic olefin **nanocomposites** with **cation** -exchanged layered silicates)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Alexandre, M; MATERIALS SCIENCE AND ENGINEERING R: REPORTS 2000, V28(1-2), P1
(2) Fibiger, R; WO 0047657 A 2000 HCAPLUS
(3) Hudson, S; US 5910523 A 1999 HCAPLUS
(4) Kurokawa, Y; JOURNAL OF MATERIALS SCIENCE LETTERS 1997, V16(20), P1670 HCAPLUS
(5) Ohkawa, H; US 4891399 A 1990 HCAPLUS

L75 ANSWER 37 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2001:534486 HCAPLUS
DN 135:123335
ED Entered STN: 25 Jul 2001
TI ABS **nanocomposite** material with high mechanical strength and manufacture of the material
IN Kuo, Wen Ta; Li, Mao Sung; Huang, Hsiao Ping; Wu, Chia Kuang; Chung, Sujng Cheng
PA Industrial Technology Research Institute, Taiwan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08L055-02
ICS C08F002-02; C08F002-18; C08F002-44; C08J003-20; C08K003-34; C08K005-00; C08K009-04
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001200135	A2	20010724	JP 2000-257201	20000828
	TW 518354	B	20030121	TW 2000-89100792	20000119
PRAI	TW 2000-89100792	A	20000119		

AB The **nanocomposite** is made of a polymer matrix containing ABS [acrylonitrile (I)-butadiene-styrene (II) resin] and a layered **clay** uniformly dispersed in the matrix optionally associated with a fireproofing agent. The composite is manufactured by the process involving (1) preparing a precursor **nanocomposite** comprising I-II copolymer matrix and the layered **clay** dispersed in the matrix and (2) blending the precursor and butadiene **rubber** optionally containing a fireproofing agent. Thus, 25:75 mixture of I and II were subjected to bulk-polymerization in the presence of fluoromica, which was ion-exchanged with benzalkonium ion and 4-vinylpyridinium ion, followed by suspension polymerization in **aqueous** poly(vinyl alc.) to give a precursor containing 5% fluoromica. Then, the precursor was blended with I-II copolymer (PN 117) and butadiene **rubber** (Blendex 338) in a twin-screw extruder to give the **nanocomposite** containing 3% fluoromica and 18% **rubber** showing elongation 24%, bending strength 754 kg/cm2, and

notched Izod impact strength 11.99 kg-cm/cm.

ST **nanocomposite** ABS resin layered **clay**; acrylonitrile styrene polymer butadiene **rubber** matrix; mech strength **nanocomposite** resin layered **clay**; fireproofing agent ABS resin **clay nanocomposite**; ion exchanged fluoromica ABS resin **nanocomposite**

IT **Quaternary** ammonium compounds, uses
RL: MOA (Modifier or additive use); USES (Uses)
(alkylbenzyldimethyl, chlorides, fluormica-treated with; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT Onium compounds
RL: MOA (Modifier or additive use); USES (Uses)
(**cation; nanocomposite** comprising matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber** and layered **clay** containing)

IT Mica-group minerals, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluorine-rich, ion-exchanged; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT Antioxidants
Antistatic agents
Fillers
Fireproofing agents
Light stabilizers
Lubricants
Plasticizers
UV stabilizers
(in **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT **Nanocomposites**
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT Butadiene **rubber**, properties
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT **Clays**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(smectitic; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 9003-56-9, ABS-D 100
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(ABS-D 100; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 9003-54-7, PN 117
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PROC

(Process); USES (Uses)
(PN 117; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 9003-17-2
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)
(butadiene **rubber, nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 86168-32-3, FR 68PB
RL: MOA (Modifier or additive use); USES (Uses)
(fireproofing agent; in **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 3283-40-7
RL: MOA (Modifier or additive use); USES (Uses)
(fluormica-treated with; **nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT **1318-93-0DP, Montmorillonite,** ion-exchanged, preparation
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PREP (Preparation); USES (Uses)
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 1318-00-9, vermiculite 1319-41-1, saponite 12068-50-7, Halloysite **12172-85-9, Beidellite 12173-47-6, Hectorite** 12174-06-0, nontronite 12174-53-7, Sericite 12417-86-6, Stevensite
RL: MOA (Modifier or additive use); USES (Uses)
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

IT 106677-58-1, Blendex 338
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**nanocomposite** comprising layered **clay** and matrix comprising acrylonitrile-styrene copolymer and butadiene **rubber**)

L75 ANSWER 38 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2002-025702 [03] WPIX
DNN N2002-019950 DNC C2002-007046
TI Flame retardant polyolefin composition for sheets or laminates used as roofing membranes and protective coatings, comprises organically modified **clay**.
DC A17 A93 P73
IN KAUSCH, C; PAYNE, P F; PETERSON, K M; POMEROY, J E; VERROCCHI, A
PA (OMNO-N) OMNOVA SOLUTIONS INC
CYC 22
PI WO 2001066627 A1 20010913 (200203)* EN 30 C08K003-34 <--
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
W: JP
US 6414070 B1 20020702 (200248) C08K003-34 <--
EP 1268630 A1 20030102 (200310) EN C08K003-34 <--
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

JP 2003530444 W 20031014 (200368) 28 C08L023-00 <--
ADT WO 2001066627 A1 WO 2001-US2278 20010124; US 6414070 B1 US 2000-521457 20000308; EP 1268630 A1 EP 2001-905016 20010124, WO 2001-US2278 20010124; JP 2003530444 W JP 2001-565790 20010124, WO 2001-US2278 20010124
FDT EP 1268630 A1 Based on WO 2001066627; JP 2003530444 W Based on WO 2001066627
PRAI US 2000-521457 20000308
IC ICM **C08K003-34; C08L023-00**
ICS B32B027-18; B32B027-20; **C08J005-18; C08K009-04**
AB WO 200166627 A UPAB: 20020114
NOVELTY - A flame retardant polyolefin composition comprises polyolefin polymer and/or copolymer having 2-8 carbon per repeat group; organically modified **clay**; and optionally inorganic flame retardant(s). The polyolefin and **clay** are **nanocomposite.**
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:
(A) a flame retardant sheet comprising the above composition;
(B) a flame retardant laminate comprising a reinforcing layer; polymer layer; and a flame retardant **nanocomposite** layer comprising the above composition;
(C) a method for preparing a flame retardant composition comprising mixing and forming a flame retardant **nanocomposite**; and
(D) a method for preparing a flame retardant **nanocomposite** or flame retardant sheet.
USE - For sheets or laminates used as roofing membranes and protective coatings.
ADVANTAGE - The invented composition offers excellent flame retardant and flame resistant properties.
Dwg.0/0
FS CPI GMPI
FA AB
MC CPI: A04-G01B; A08-F; A08-F01; A12-R05

L75 ANSWER 39 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2002-165794 [22] WPIX
DNN N2002-126614 DNC C2002-051273
TI **Nanocomposite,** useful as sheath or outer coating of power and telecommunication cables, comprises a **clay** bridged with a metal compound, and an organic compound.
DC A85 X12
IN AMIGOUET, P; BERGAYA, F; FOMPERIE, L; MANDALIA, T
PA (NEXA-N) NEXANS; (COGE) ALCATEL SA
CYC 29
PI EP 1160277 A1 20011205 (200222)* EN 10 C08K009-02 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
CA 2349141 A1 20011130 (200222) EN C08K003-34 <--
FR 2809737 A1 20011207 (200222) C08K003-34 <--
US 2002010248 A1 20020124 (200222) B01J021-16
JP 2002053316 A 20020219 (200229) 22 C01B033-44
US 6674009 B2 20040106 (200411) H01B003-00
ADT EP 1160277 A1 EP 2001-401232 20010514; CA 2349141 A1 CA 2001-2349141 20010529; FR 2809737 A1 FR 2000-7017 20000531; US 2002010248 A1 US 2001-866836 20010530; JP 2002053316 A JP 2001-161109 20010529; US 6674009 B2 US 2001-866836 20010530
PRAI FR 2000-7017 20000531
IC ICM B01J021-16; C01B033-44; **C08K003-34; C08K009-02;** H01B003-00
ICS **C08J003-00; C08L023-06; C08L101-00;**

H01B003-28; H01B003-30; H01B003-40; H01B003-42; H01B003-44;
H01B007-295; H01B009-00; H01B011-00
ICA B01J029-04
AB EP 1160277 A UPAB: 20020409
NOVELTY - **Nanocomposite** comprising (i) a **clay** bridged with a metal compound and (ii) an organic compound.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for: (1) a process for producing the **nanocomposite** of the claim comprising preparing the bridged **clay**, and mixing with organic compound; (2) a power cable comprising the **nanocomposite** of the claim either in its sheath, as its sheath or as on outer coating for its sheath; and (3) a telecommunications cable comprising the **nanocomposite** of the claim in its sheath.
USE - For use as sheath or outer coating of cables, e.g., power cable or telecommunication cable.
ADVANTAGE - The inventive **nanocomposite** exhibits improved mechanical properties, good heat resistance, excellent fire resistance, and improved **water** and solvent impermeability.
Dwg.0/2
FS CPI EPI
FA AB
MC CPI: A07-A05; A12-E02A
EPI: X12-D05

L75 ANSWER 40 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2001:631138 HCAPLUS
DN 135:345665
ED Entered STN: 31 Aug 2001
TI **Clay Nanolayer** Reinforcement of a Silicone **Elastomer**
AU LeBaron, Peter C.; Pinnavaia, Thomas J.
CS Department of Chemistry and Center for Fundamental Materials Research, Michigan State University, East Lansing, MI, 48824, USA
SO Chemistry of Materials (2001), 13(10), 3760-3765
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 38
AB A synthetic fluorohectorite **clay** in which the exchange **cations** have been replaced by hexadecyltrimethylammonium ions, abbreviated C16FH, has been shown to readily intercalate linear poly(dimethylsiloxane) (PDMS) mols. containing terminal hydroxyl groups. The extent of gallery swelling increased with increasing PDMS mol. weight over the range 400-4200. Little or no intercalation was observed for PDMS mols. terminated by Me groups, indicating that terminal silanol interactions with the gallery surfaces are an important part of the gallery swelling mechanism. These interfacial interactions may also account for the unusual correlation between the extent of gallery swelling and the mol. weight of the intercalated linear polymer. Crosslinking reactions between PDMS-4200 and tetra-Et orthosilicate in the presence of the C16FH organoclay afforded **elastomeric nanocomposites** in which the **clay nanolayers** were exfoliated. The **nanolayer**-reinforced polymer exhibited substantially improved tensile properties and resistance to swelling by an organic solvent in comparison to the pristine polymer. Also, **nanolayer** reinforcement greatly reduced the structural damage caused by the internal

strain induced upon allowing the solvent to evaporate from the swollen polymer network. Although synthetic fluorohectorite has one of the highest **nanolayer** aspect ratios among smectite **clays**, relatively small redns. in oxygen permeability were observed for the **nanocomposites**. A more or less random orientation of the **clay nanolayers** in the polymer matrix, as indicated from TEM images of thin sectioned samples, was responsible for the lack of an effective permeant barrier.

ST **clay nanolayer** silicone **rubber** intercalated;
fluorohectorite hexadecyltrimethylammonium exchanged silicone
rubber nanocomposite; intercalation polysiloxane ion
exchanged fluorohectorite

IT Elongation, mechanical
Nanocomposites
Permeability
Stress-strain relationship
Swelling, physical
(hexadecyltrimethylammonium bromide-exchanged fluorohectorite
clay intercalation with linear poly(dimethylsiloxane))

IT Polysiloxanes, preparation
Silicone **rubber**, preparation
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(hexadecyltrimethylammonium bromide-exchanged fluorohectorite
clay intercalation with linear poly(dimethylsiloxane))

IT 7782-44-7, Oxygen, miscellaneous
RL: MSC (Miscellaneous)
(hexadecyltrimethylammonium bromide-exchanged fluorohectorite
clay intercalation with linear poly(dimethylsiloxane))

IT 31692-79-2D, Poly(dimethylsiloxane) hydroxy-terminated, intercalation compds. with hexadecyltrimethylammonium ion-exchanged fluorohectorite **clay** 31900-57-9D, Dimethylsilanediol homopolymer, hydroxy- and methyl-terminated, intercalation compds. with hexadecyltrimethylammonium ion-exchanged fluorohectorite **clay**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(hexadecyltrimethylammonium bromide-exchanged fluorohectorite
clay intercalation with linear poly(dimethylsiloxane))

IT **57-09-0DP**, Hexadecyltrimethylammonium bromide, ion exchanged on fluorohectorite-exchanged, intercalation compds. with polydimethylsiloxanes **12173-47-6DP**, Fluorohectorite, hexadecyltrimethylammonium bromide-exchanged, intercalation compds. with polydimethylsiloxanes
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(hexadecyltrimethylammonium bromide-exchanged fluorohectorite
clay intercalation with linear poly(dimethylsiloxane))

IT 160998-16-3DP, Dimethylsilanediol-tetraethyl orthosilicate copolymer, intercalation compds. with hexadecyltrimethylammonium ion-exchanged fluorohectorite **clay**
RL: **POF (Polymer in formulation)**; PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(**rubber**; hexadecyltrimethylammonium bromide-exchanged
fluorohectorite **clay** intercalation with linear
poly(dimethylsiloxane))

RE.CNT 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
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(39) Yano, K; J Polym Sci, Part A: Polym Chem 1997, V35, P2289 HCAPLUS

L75 ANSWER 41 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN DUPLICATE 6
AN R:832041 RAPRA FS Rapra Abstracts
TI **CLAY NANOLAYER** REINFORCEMENT OF cis-1,4-POLYISOPRENE
AND EPOXIDISED NATURAL **RUBBER**.
AU Yen T Vu; Mark J E; Pham Ly H; Engelhardt M (Cincinnati,University;
Hanoi,Institute of Chemistry; Yokohama **Tire** Corp.)
SO Journal of Applied Polymer Science 82, No.6, 7th Nov.2001, p.1391-403
ISSN: 0021-8995
CODEN: JAPNAB
PY 2001
DT Journal
LA English
AB The conditions required for dispersing sodium **montmorillonite**
clay nanolayers into cis-1,4-polyisoprene (synthetic)
natural **rubber** (NR) and epoxidised natural **rubbers**
(ENR) containing 25 and 50 mole% epoxide were established. The
clay was used as a pristine layered silicate or as organically
modified silicate layers, to make the galleries more hydrophobic and thus
more compatible with the **elastomers**. Ion exchange with alkyl
ammonium **cations** was used for chemical modification. The
clays were incorporated into the **elastomers** by mixing

the components in a standard internal blender or by mixing their dispersions in toluene or methyl ethyl ketone. The X-ray diffraction patterns indicated intercalation of the NR and ENR into the silicate interlayers, with subsequent exfoliation of the silicate layers into the **elastomer** matrices. The observed mechanical reinforcement of the **elastomers** by the intercalated and exfoliated **clays** was strongly dependent on the extent of dispersion of the silicate layers into the **rubber** matrices, and was of primary interest. 61 refs.

CC 51SC1; 42D121; 41C1; 9924; 9.11; 95

SC *MB; IA; KO; UG; UC

CT BLEND; CHEMICAL MODIFICATION; COMPANIES; COMPANY; DATA; DISPERSION; DYNAMIC MECHANICAL PROPERTIES; DYNAMIC PROPERTIES; **ELASTOMER**; EPOXIDISED NR; EPOXIDIZED NR; EXFOLIATION; FILLER; GRAPH; HYDROGENATION; INSTITUTION; INTERCALATION; ION EXCHANGE; ION-EXCHANGE; ISOPRENE POLYMER; LOSS TANGENT; MECHANICAL PROPERTIES; MORPHOLOGICAL PROPERTIES; MORPHOLOGY; **NANOCOMPOSITE**; **NANOLAYER**; **NATURAL RUBBER**; NR; POLYISOPRENE; PROPERTIES; REINFORCEMENT; **RUBBER** ; STRAIN; STRESS; STRESSES; **SYNTHETIC RUBBER**; TABLES; TECHNICAL; WIDE ANGLE X-RAY SCATTERING; X-RAY SCATTERING

NPT AMMONIUM ION; CALCIUM STEARATE; **CLAY**; ETHYL METHYL KETONE; METHYLBENZENE; STEARIC ACID; SULFUR; SULPHUR; TALLOW; TOLUENE; ZINC OXIDE

SHR NATURAL **RUBBER**, X-ray diffraction, mechanical properties, morphological properties, **nanocomposites**; ISOPRENE POLYMERS, X-ray diffraction, mechanical properties, morphological properties, **nanocomposites**; X-RAY DIFFRACTION, NR, isoprene polymers, mechanical properties, morphological properties, **nanocomposites** ; MECHANICAL PROPERTIES, NR, isoprene polymers, X-ray diffraction, morphological properties, **nanocomposites**; MORPHOLOGICAL PROPERTIES, Nr, isoprene polymers, X-ray diffraction, mechanical properties, **nanocomposites**; COMPOSITES, NR, isoprene polymers, **nanocomposites**, X-ray diffraction, mechanical properties, morphological properties

GT USA; VIETNAM

L75 ANSWER 42 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 7

AN 2001:317534 HCAPLUS

DN 135:62512

ED Entered STN: 04 May 2001

TI Surface-compatibilized layered silicates: a novel class of **nanofillers** for **rubbers** with improved mechanical properties

AU Ganter, M.; Gronski, W.; Semke, H.; Zilg, T.; Thomann, C.; Muhlhaupt, R.

CS Freiburg, Germany

SO Kautschuk Gummi Kunststoffe (2001), 54(4), 166-171
CODEN: KGUKAC; ISSN: 0022-9520

PB Huethig GmbH

DT Journal

LA English

CC 39-9 (Synthetic Elastomers and Natural **Rubber**)

AB Layered silicates were made compatible with **SBR rubber** matrix by (i) swelling a com. organophilic **clay** of the **Montmorillonite** type in **SBR** solution and (ii) by **cation** exchange of a synthetic Fluorhectorite with protonated amino-terminated polybutadiene (ATB). The effect of the surface-compatibilized silicates relative to conventional silica filler was tested with **SBR** vulcanizates in which silica was either completely or partially exchanged by layered silicate. TEM reveals the morphol. of the **rubber nanocomposites** with finely

dispersed intercalated aggregates or partially exfoliated layers
suggesting that reinforcement and hysteresis are related to the
anisotropic nature of the aggregates and concomitant orientation during
strain.

ST layered silicate surface compatibilized **SBR rubber**
property

IT Nitrile **rubber**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(amine-terminated, Hycar ATB; mech. properties of **SBR**
rubber containing surface-compatibilized layered silicates)

IT Breaking strength
Mechanical loss
Polymer morphology
Tensile strength
(mech. properties of **SBR rubber** containing
surface-compatibilized layered silicates)

IT **Styrene-butadiene rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(mech. properties of **SBR rubber** containing
surface-compatibilized layered silicates)

IT 7631-86-9, Silica, uses
RL: MOA (Modifier or additive use); USES (Uses)
(filler; mech. properties of **SBR rubber** containing
surface-compatibilized layered silicates)

IT 40372-72-3, Si69
RL: MOA (Modifier or additive use); USES (Uses)
(mech. properties of **SBR rubber** containing
surface-compatibilized layered silicates)

IT **1318-93-0D, Montmorillonite,** ammonium-exchanged
182636-27-7, Somasif ME 100
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(mech. properties of **SBR rubber** containing
surface-compatibilized layered silicates)

IT 9003-18-3
RL: MOA (Modifier or additive use); USES (Uses)
(nitrile **rubber**, amine-terminated, Hycar ATB; mech.
properties of **SBR rubber** containing
surface-compatibilized layered silicates)

IT **9003-55-8**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(**styrene-butadiene rubber**, mech.
properties of **SBR rubber** containing
surface-compatibilized layered silicates)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
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L75 ANSWER 43 OF 59 JICST-EPlus COPYRIGHT 2004 JST on STN
AN 1011059152 JICST-EPlus
TI Effective capture of **nanoparticles** onto LB film surface by the adsorption from their dispersions.
AU TAMAKI URA; IMAI YOKO; TAJIMA KAZUO
TAKAHASHI MASASHI; KOBAYASHI KOICHI
CS Kanagawa Univ., Fac. of Eng.
Musashi Inst. of Technol., Fac. of Eng.
SO Yukagaku Toronkai Koen Yoshishu, (2001) vol. 40th, pp. 141. Journal Code: L0847A (Fig. 2, Tbl. 1, Ref. 1)
ISSN: 1341-7231
CY Japan
DT Conference; Short Communication
LA Japanese
STA New
AB The present paper was investigated on the preparation of close-packed unilayer arrangement with **nano**-size particles on bicationic LB film by the adsorption from their aqueous dispersions. Two LB layers of N,N'-o-xylylene-bis(octadecyldimethyl-ammonium chloride) was fabricated on the Si-wafer substrate on which the particles was adhesived. The kinds of used particles were synthetic polymer particles (88, 335, 533, and 923nm), SiO_2 particles (280 and 990nm), Au metal particles (29nm), and further amorphous carbon particles (62nm), and **clay** particles (45nm).
The arrangement of adsorbed particle on the LB film was observed by the TEM or SEM photo image. As a result, synthetic polymer and SiO_2 articles was formed in a closest packed arrangement like a two dimensional crystal when surface potential of particles had been controlled near at almost their ZPC of about -0.29 to -3.0mV for these dispersion pHs. On the other hand, these dispersions at the neutral pH adsorbed in the widely. scatted and loosed order. Furthermore, it let me adsorb Au, Amorphous carbon and a **clay** minute article on the large area by using adsorption method. Consequently, a two-dimensional crystal of particle film was formed by controlling the surface potential of particles and their size distribution. (author abst.)
CC BK14010X (539.23)
CT LB film; ultrafine particle; silica; gold; carbon; **clay** mineral; **latex**; adsorption; **quaternary** ammonium
BT membrane and film; fine particle; particle; silicon dioxide; silicon oxide; silicon compound; carbon group element compound; oxide; chalcogenide; oxygen group element compound; oxygen compound; 1B group element; transition metal; metallic element; element; second row element; carbon group element; soil mineral; mineral(geology); soil component; component; colloid; disperse system; emulsion; amine; onium compound
ST **nanoparticle**

L75 ANSWER 44 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2000:133762 HCAPLUS
DN 132:167197
ED Entered STN: 25 Feb 2000
TI Intercalates formed with MXD6 nylon intercalants
IN Lan, Tie; Cruz, Hannah T.; Tomlin, Anthony S.
PA Amcol International Corporation, USA
SO PCT Int. Appl., 77 pp.
CODEN: PIXXD2
DT Patent
LA English

IC   ICM   C08K009-04
       ICS   C08L077-00
CC   37-6 (Plastics Manufacture and Processing)
       Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000009605	A1	20000224	WO 1999-US18579	19990816

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	US 6232388	B1	20010515	US 1999-272278	19990319
	AU 9956751	A1	20000306	AU 1999-56751	19990816
	GB 2354002	A1	20010314	GB 2000-29174	19990816
	GB 2354002	B2	20030108		
	DE 19983538	T	20010712	DE 1999-19983538	19990816
PRAI	US 1998-96774P	P	19980817		
	US 1999-272278	A	19990319		
	WO 1999-US18579	W	19990816		

AB   Intercalated layered materials are prepared by co-intercalation of an onium ion and MXD6 nylon between the planar layers of a swellable layered material, such as a phyllosilicate, preferably a smectite **clay**. The spacing of adjacent layers of the layered materials is expanded at least about 3 Å, preferably at least about 5 Å, usually preferably to a d-spacing of about 15-20 Å, e.g., 18 Å with the onium ion spacing/coupling agent. The intercalation of the MXD6 nylon polymer then increases the spacing of adjacent layers an addnl. at least 3 Å, e.g., to at least about 20 Å, preferably about 25 Å to about 30 Å, generally about 28 Å. Plastic and **rubber** composites containing the intercalated layered materials or/and their exfoliates have good dispersibility and low air permeability.

ST   xylenediamine nylon intercalation layered compd; onium ion intercalation **bentonite clay**

IT   **Clays**, properties
       RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
          (bentonitic; intercalates formed with MXD6 nylon intercalants and composites)

IT   **Nanocomposites**
          (intercalates formed with MXD6 nylon intercalants and composites)

IT   Intercalated phyllosilicates
       Intercalation compounds
       RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
          (intercalates formed with MXD6 nylon intercalants and composites)

IT   **Rubber**, uses
       RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
          (intercalates formed with MXD6 nylon intercalants and composites)

IT   **Clays**, properties
       RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
          (smectitic; intercalates formed with MXD6 nylon intercalants and

composites)
IT Onium compounds
Phosphonium compounds
Quaternary ammonium compounds, uses
Sulfonium compounds
RL: MOA (Modifier or additive use); USES (Uses)
(spacing/coupling agent; intercalates formed with MXD6 nylon intercalants and composites)
IT Plastics, uses
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(thermoplastics, composites; intercalates formed with MXD6 nylon intercalants and composites)
IT Plastics, uses
RL: **POF (Polymer in formulation)**; TEM (Technical or engineered material use); USES (Uses)
(thermosetting, composites; intercalates formed with MXD6 nylon intercalants and composites)
IT 25718-70-1, Adipic acid-m-xylenediamine copolymer 25805-74-7, MXD6
RL: MOA (Modifier or additive use); USES (Uses)
(intercalants; intercalates formed with MXD6 nylon intercalants and composites)
IT 1838-08-0, Octadecylammonium chloride 1875-92-9D, Dimethylbenzylammonium chloride, alkyl chloride **quaternary** ammonium salt
RL: MOA (Modifier or additive use); USES (Uses)
(spacing/coupling agent; intercalates formed with MXD6 nylon intercalants and composites)
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Allied Signal Inc; WO 9304117 A 1993 HCAPLUS
(2) Wolff Walsrode Ag; EP 0818508 A 1998 HCAPLUS

L75 ANSWER 45 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2000:157728 HCAPLUS
DN 132:181901
ED Entered STN: 09 Mar 2000
TI **Nanocomposite** materials formed from inorganic layered materials dispersed in a polymer matrix
IN Elspass, Chester W.; Peiffer, Dennis George
PA Exxon Research and Engineering Co., USA
SO U.S., 5 pp., Cont.-in-part of U.S. Ser. No. 804,021, abandoned.
CODEN: USXXAM
DT Patent
LA English
IC ICM C08K003-34
ICS C08K003-10
NCL 524445000
CC 39-13 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 37
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6034164	A	20000307	US 1998-187872	19981106
PRAI	US 1997-804021		19970221		

OS MARPAT 132:181901
AB Composition having sufficiently low air permeability to be useful as a tire inner liner, among other things, is prepared by blending a layered material with a metal processible nonionic 1st polymer having a number-average mol.-weight

≥50,000 g/mol and a 2nd nonionic polymer compatible with the 1st polymer and having a number-average mol.-weight less than that of the 1st polymer.
Thus, a **nanocomposite** was prepared by blending a dialkylammonium-modified **montmorillonite** 5, a brominated isobutylene-p-methylstyrene **rubber** (I; number-average mol.-weight 70000 g/mol) 2.75, I (number-average mol.-weight 300000 g/mol) 47.3 g.

ST **rubber** coated alkylammonium modified **montmorillonite**; tire inner liner coated **montmorillonite**; isobutylene methylstyrene **rubber** coating **montmorillonite**

IT Synthetic **rubber**, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(isobutylene-methylstyrene, brominated; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT Butadiene **rubber**, properties
Butyl **rubber**, properties
Isoprene **rubber**, properties
Natural **rubber**, properties
Styrene-butadiene rubber, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT Phosphonium compounds
Pyridinium compounds
Quaternary ammonium compounds, uses
RL: MOA (Modifier or additive use); USES (Uses)
(**rubber**-coated; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9003-17-2
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(butadiene **rubber**, **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9010-85-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(butyl **rubber**, **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT **1318-93-0, Montmorillonite**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(dialkylammonium-modified; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 9003-31-0
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(isoprene **rubber**, **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT 61128-14-1D, Isobutylene-p-methylstyrene copolymer, brominated
61128-14-1D, Isobutylene-p-methylstyrene copolymer, p-halogenated
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**rubber**; **nanocomposite** materials formed from inorg. layered materials dispersed in a polymer matrix)

IT **9003-55-8**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM

(Technical or engineered material use); PROC (Process); USES (Uses)
(**styrene-butadiene rubber**,
nanocomposite materials formed from inorg. layered materials
dispersed in a polymer matrix)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Anon; WO 9304118 1993 HCAPLUS
(2) Beall; US 5552469 1996 HCAPLUS
(3) Beall; US 5578672 1996 HCAPLUS
(4) Horii; US 5539015 1996 HCAPLUS
(5) Kawasumi; US 4810734 1989 HCAPLUS
(6) Kresge; US 5576372 1996
(7) Kresge; US 5576373 1996
(8) Kresge; US 5665183 1997
(9) Usuki; US 4889885 1989 HCAPLUS

L75 ANSWER 46 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2000-543341 [49] WPIX
DNC C2000-161615
TI Organophilic foliated silicates, useful in molding, (**nano**
)composite, lacquer, adhesive, casting resin, coating, flame retardant,
thixotropic agent or reinforcement, are obtained by treating foliated
silicate with melaminium salt.
DC A21 A25 A60 E13 E33 L02
IN FINTER, J; MUEHLHAUPT, R; ZILIG, C; MUELHAUPT, R; ZILG, C
PA (VANT-N) VANTICO AG
CYC 24
PI WO 2000044669 A1 20000803 (200049)* GE 32 C01B033-44
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: BR CN JP KR US
EP 1165438 A1 20020102 (200209) GE C01B033-44
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
BR 2000007830 A 20020115 (200214) C01B033-44
KR 2001101734 A 20011114 (200230) C01B033-021
CN 1339013 A 20020306 (200236) C01B033-44
JP 2002535233 W 20021022 (200301) 31 C01B033-44
ADT WO 2000044669 A1 WO 2000-EP480 20000122; EP 1165438 A1 EP 2000-903610
20000122, WO 2000-EP480 20000122; BR 2000007830 A BR 2000-7830 20000122,
WO 2000-EP480 20000122; KR 2001101734 A KR 2001-709434 20010726; CN
1339013 A CN 2000-803230 20000122; JP 2002535233 W JP 2000-595932
20000122, WO 2000-EP480 20000122
FDT EP 1165438 A1 Based on WO 2000044669; BR 2000007830 A Based on WO
2000044669; JP 2002535233 W Based on WO 2000044669
PRAI CH 1999-160 19990128
IC ICM C01B033-021; C01B033-44
ICS C04B014-20; **C08J005-00; C08K009-04;**
C08L021-00; C08L063-00; C08L075-04;
C08L101-00
AB WO 200044669 A UPAB: 20001006
NOVELTY - Organophilic foliated silicates (I) are claimed, which are
obtained by treating natural or synthetic foliated silicate(s) with
salt(s) (II) of an optionally **quaternary**, cyclic melamine
compound.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for (a)
thermoplastic polymers, thermosetting polymer systems, polyurethanes and
rubbers containing (I); (b) molding compositions and moldings in
the form of composites, especially **nano**-composites, containing
(I); (c) lacquers, adhesives, casting resins, coatings, flame retardants,

thixotropic agents and/or reinforcements containing (I); (d) the use of amidine compounds, comprising salts (IIA), (IIB) and (IIC) of melamine with 1, 2 or 3 **quaternized** amino groups, for the production of (I).

USE - Organophilic foliated silicates (I) are used in molding compositions and finished moldings and composites, preferably in the production of **nano**-composites; and the molding compositions are used in the production of lacquers, adhesives, casting resins, coatings, flame retardants, thixotropic agents and/or reinforcements (all claimed).

ADVANTAGE - Organophilic foliated silicates (I) combine good high temperature stability in processing with excellent dispersion and interfacial adhesion. Relatively large amounts can be added to thermosetting resins without increasing the viscosity, whilst (I) prepared from cyclic melamines with reactive groups can be grafted with the matrix. Melaminium ions derived from melamine or aminopropionic or 12-aminododecanoic acid give good layer separation combined with excellent adhesion to numerous polymers and fillers. Efficient **cation** exchange in the interlaminar spaces is obtained with melaminium salts with long and optionally substituted alkyl groups. In addition, (I) are not only excellent fillers for enhancing the mechanical properties of polymers but also act as flame retardants without the disadvantage of increased **water** absorption with melamine composites.

Dwg.0/0

FS CPI

FA AB; DCN

MC CPI: A08-F; A08-M06; A08-R06B; A12-A05; A12-B01; E07-D13B; E31-P02B; E31-P05B; L02-D15D

L75 ANSWER 47 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 2000:182041 HCAPLUS

DN 132:309555

ED Entered STN: 22 Mar 2000

TI Morphology, mechanical properties and mechanism of reinforcement of **rubber nanocomposites**

AU Ganter, Markus; Reichert, Peter; Mulhaupt, Rolf; Gronski, Wolfram

CS Freiburger Materialforschungszentrum FMF, Albert-Ludwigs-Universitat, Freiburg, D-79104, Germany

SO Polymeric Materials Science and Engineering (2000), 82, 228-229
CODEN: PMSEDG; ISSN: 0743-0515

PB American Chemical Society

DT Journal

LA English

CC 39-9 (Synthetic Elastomers and Natural **Rubber**)

AB Organophilic layered silicates show good dispersibility in **rubber** matrixes. They show slightly improved **rubber** reinforcement compared to precipitated silica, but the hysteresis is significantly higher than in silica-loaded compds. The reactive coupling agent, bis(triethoxysilylpropyl)tetrasulfan, Si69, has a similar effect for both filler types: lower stress at break and reduced hysteresis by inhibiting chain slip at filler surface. The mechanisms governing reinforcement are orientation of silicate layers with elongation/retraction and a chain slip process along silicate layers or filler aggregates.

ST ammonium **montmorillonite** reinforcement butadiene **rubber** **SBR** morphol stress strain

IT Stress-strain relationship
(morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)

IT **Styrene-butadiene rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
IT Butadiene **rubber**, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(of cis-1,4-configuration; morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
IT **1318-93-0, Montmorillonite**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(ammonium-modified; morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
IT 9003-17-2
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(butadiene **rubber**, of cis-1,4-configuration; morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
IT 107-64-2, Dimethyldistearylammonium chloride
RL: NUU (Other use, unclassified); USES (Uses)
(**montmorillonite cation** exchanged with; morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
IT 40372-72-3, Si69
RL: MOA (Modifier or additive use); USES (Uses)
(morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
IT **9003-55-8**
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(**styrene-butadiene rubber**, morphol., mech. properties and mechanism of reinforcement of **rubber nanocomposites**)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Giannelis, E; Adv Mater 1996, V8, P29 HCAPLUS
(2) Kawasumi, M; Macromolecules 1997, V30, P6333 HCAPLUS
(3) Okada, A; ACS Symposium Series 1995
(4) Reichert, P; Acta Polymerica 1998, V49, P116 HCAPLUS
(5) Zilg, C; Advanced Materials 1999, V11, P49 HCAPLUS
(6) Zilg, C; Kunststoffe 1998, V88, P1812 HCAPLUS
(7) Zilg, C; Macromol Chem & Phys 1999, V200, P661 HCAPLUS

L75 ANSWER 48 OF 59 COMPENDEX COPYRIGHT 2004 EEI on STN
AN 2000(31):898 COMPENDEX
TI Polymer-layered silicate **nanocomposites**: Preparation, properties and uses of a new class of materials.
AU Alexandre, Michael (Univ of Mons-Hainaut, Mons, Belgium); Dubois, Philippe
SO Materials Science and Engineering: R: Reports v 28 n 1 2000.p 1-63
CODEN: MIGIEA ISSN: 0927-796X
PY 2000
DT Journal
TC Bibliography; Experimental
LA English
AB This review aims at reporting on very recent developments in syntheses, properties and (future) applications of polymer-layered silicate **nanocomposites**.This new type of materials, based on smectite **clays** usually rendered hydrophobic through ionic exchange of the sodium interlayer **cation** with an onium **cation**, may be prepared via various synthetic routes comprising exfoliation adsorption,

in situ intercalative polymerization and melt intercalation.The whole range of polymer matrices is covered, i.e. thermoplastics, thermosets and **elastomers.**Two types of structure may be obtained, namely intercalated **nanocomposites** where the polymer chains are sandwiched in between silicate layers and exfoliated **nanocomposites** where the separated, individual silicate layers are more or less uniformly dispersed in the polymer matrix. This new family of materials exhibits enhanced properties at very low filler level, usually inferior to 5 weight%, such as increased Young's modulus and storage modulus, increase in thermal stability and gas barrier properties and good flame retardancy.(Author abstract) 115 Refs.

CC 482.2 Minerals; 933.1 Crystalline Solids; 815.2 Polymerization; 641.1 Thermodynamics; 802.3 Chemical Operations; 803 Chemical Agents
CT *Silicates; **Nanostructured** materials; Polymerization; Adsorption; Flame retardants; Thermodynamic stability
ST Exfoliation

L75 ANSWER 49 OF 59 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN DUPLICATE 8
AN 1999-592912 [51] WPIX
DNC C1999-173308
TI Organoclay chemical composition useful as rheological additives or in production of **nanocomposites.**
DC A18 A28 A60 E19 G02 H07
IN KAIZERMAN, J; ROSS, M
PA (RHEO-N) RHEOX INC
CYC 29

PI

EP 952187	A1	19991027	(199951)*	EN	16	C08K009-04	<--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI							
CA 2255488	A1	19991022	(200013)	EN		C08K009-04	<--
JP 2000026655	A	20000125	(200016)		48	C08K009-04	<--
MX 9902870	A1	20000801	(200137)			C08K003-34	<--
US 6380295	B1	20020430	(200235)			C08K003-34	<--
US 2004087700	A1	20040506	(200430)			C08K003-34	<--

ADT EP 952187 A1 EP 1999-300881 19990205; CA 2255488 A1 CA 1998-2255488 19981208; JP 2000026655 A JP 1999-111711 19990420; MX 9902870 A1 MX 1999-2870 19990325; US 6380295 B1 US 1998-64216 19980422; US 2004087700 A1 Cont of US 1998-64216 19980422, US 2001-14852 20011214
FDT US 2004087700 A1 Cont of US 6380295
PRAI US 1998-64216 19980422; US 2001-14852 20011214
IC ICM **C08K003-34; C08K009-04**
ICS C01B033-44; **C08K005-17; C08L101-16;** C09K003-00; C10M113-10
AB EP 952187 A UPAB: 19991207
NOVELTY - Hybrid organoclay comprising ion-exchanged organic chemical/phyllosilicate **clay** intercalate provides a better dispersing composition without the need for energy-intensive isolation techniques. The intercalate is obtained by the intercalation and reaction of a smectite **clay,** a **quaternary** ammonium compound and a non-anionic organic material.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for

(a) a **nanocomposite** comprising a matrix of polymer, plastic or resin and the above organoclay; and

(b) a rheological additive for liquid organic systems comprising the above organoclay.

USE - For use in the production of **nanocomposites** with improved characteristics or as rheological additive in liquid organic systems e.g. paints and coatings.

Dwg.0/0
FS CPI
FA AB; DCN
MC CPI: A08-M06; E07-E01; E10-A22E; E10-A22G; E31-P02B; G02-A03; H07-G06

L75 ANSWER 50 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:549317 HCAPLUS
DN 131:171089
ED Entered STN: 31 Aug 1999
TI Organophilic phyllosilicates for filling polymeric materials
IN Zilg, Carsten; Mulhaupt, Rolf; Finter, Jurgen
PA Ciba Specialty Chemicals Holding Inc., Switz.
SO PCT Int. Appl., 59 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08K009-00
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): **39**
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9942518	A2	19990826	WO 1999-EP881	19990210
	WO 9942518	A3	19991007		
	W: BR, CN, JP, KR				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	BR 9908120	A	20001024	BR 1999-8120	19990210
	EP 1060211	A2	20001220	EP 1999-910216	19990210
	EP 1060211	B1	20030423		
	R: CH, DE, ES, FR, GB, IT, LI, NL				
	JP 2002504582	T2	20020212	JP 2000-532468	19990210
	ES 2195547	T3	20031201	ES 1999-910216	19990210
	US 6197849	B1	20010306	US 1999-248649	19990211
PRAI	CH 1998-408	A	19980220		
	WO 1999-EP881	W	19990210		

OS MARPAT 131:171089
AB Organophilic phyllosilicates are manufactured by treating a naturally occurring or synthetic phyllosilicate, or a mixture of such silicates, with a salt of a **quaternary** or other cyclic amidine compound, or with a mixture of such salts. These products in the exfoliated form are useful as fillers for thermoplastic polymers and thermosetting polymer systems, preferably epoxy resins, polyurethanes and **rubbers** in the manufacture of **nanocomposites**. A typical organophilic phyllosilicate was manufactured by reaction of 466.7 castor oil 4 h at 150° with 135.23 g ethylenediamine, mixing 154.6 g resulting ricinyl-4,5-dihydro-1H-imidazole with 48 mL HCl in 4 L **water**, and mixing 200 g Somasif ME100 (synthetic 3-layer silicate) with the resulting hot solution
ST organophilic phyllosilicate filler **nanocomposite** manuf; ricinyldihydroimidazole hydrochloride treated phyllosilicate filler; **rubber nanocomposite** amidine salt treated phyllosilicate; polyurethane **nanocomposite** amidine salt treated phyllosilicate; epoxy resin **nanocomposite** amidine salt treated phyllosilicate
IT Onium compounds
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(4,5-dihydro-1-methyl-2-nortallow alkyl-1-(2-tallow amidoethyl)

imidazolium, Me sulfates, Rewoquat W75; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT Fillers
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT **Bentonite,** uses
Phyllosilicate minerals
Quaternary ammonium compounds, uses
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT Polyurethanes, uses
Rubber, uses
RL: **POF (Polymer in formulation);** USES (Uses)
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT Epoxy resins, properties
RL: **POF (Polymer in formulation);** PRP (Properties); USES (Uses)
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT Soybean oil
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process); USES (Uses)
(epoxidized, anhydride-cured; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT Silicates, uses
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(phyllo-; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT Castor oil
RL: RCT (Reactant); RACT (Reactant or reagent)
(salt precursor; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT 29658-97-7DP, Dodecenylsuccinic acid, derivs., reaction products with epoxy resins 33435-76-6DP, reaction products with dodecenylsuccinates 62449-33-6P 173939-82-7P, Servamine KOO 330 173939-83-8P, Servamine KOO 360 238761-44-9P 239091-86-2P
RL: IMF (Industrial manufacture); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process); USES (Uses)
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT 1318-00-9, Vermiculite **1318-93-0, Montmorillonite,** uses 1319-41-1, Saponite **12172-85-9, Beidellite** **12173-47-6, Hectorite** 12174-06-0, Nontronite 12244-16-5, Halloysite 12417-86-6, Stevensite **12424-32-7,** **Sauconite** 65559-84-4D, 3-(2-Aminoethyl)-4,5-dihydro-1-methylimidazolinium methyl sulfate, tallow derivs. 182636-27-7, Somasif ME 100
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT 33435-76-6

RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT 238761-43-8P
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(salt precursor; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

IT 107-15-3, 1,2-Ethanediamine, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(salt precursor; amidine salt-treated phyllosilicates for filling polymeric materials in manufacture of **nanocomposites**)

L75 ANSWER 51 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1998:721814 HCAPLUS
DN 129:317113
ED Entered STN: 13 Nov 1998
TI Polymer and **rubber nanocomposites** based upon layered silicates
AU Zilg, Carsten; Reichert, Peter; Dietsche, Frank; Engelhardt, Thomas; Muelhaupt, Rolf
CS Materialforschungszentrum Freiburg, Freiburg/Br., Germany
SO Kunststoffe (1998), 88(10), 1812-1813,1916,1818,1820
CODEN: KUNSAV; ISSN: 0023-5563
PB Carl Hanser Verlag
DT Journal; General Review
LA German
CC 38-0 (Plastics Fabrication and Uses)
Section cross-reference(s): **39**

AB A review with 15 refs. on the preparation and material properties of polymer and **rubber** composites with organophilic layered silicates. The layered silicates, e.g. **montmorillonite**, were modified by a treatment with **quaternary** alkylammonium ions and then incorporated into plastics or **rubber** matrixes. The strength, firmness, stiffness, and thermal plasticity of these **nanocomposites** was increased and their optical and elec. properties were improved. Possible applications were discussed due to their barrier effect against gas and liquid permeation and their flame retardancy.

ST review polymer **rubber nanocomposite** layered silicate

IT Silicates, uses
RL: MOA (Modifier or additive use); USES (Uses)
(layered, surface-modified; preparation and properties of polymer and **rubber** composites with organophilic layered silicates)

IT **Rubber**, uses
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(preparation and properties of polymer and **rubber** composites with organophilic layered silicates)

IT Reinforced plastics
RL: PRP (Properties)
(preparation and properties of polymer and **rubber** composites with organophilic layered silicates)

L75 ANSWER 52 OF 59 RAPRA COPYRIGHT 2004 RAPRA on STN
AN R:726252 RAPRA FS Rapra Abstracts
TI HYBRID ORGANIC-INORGANIC MATERIALS: STRUCTURAL ASPECTS AND PROPERTIES.
AU Mascia L (Loughborough,University)
SO Chimica e l'industria 80, No.5, June 1998, p.623-8

PY 1998
DT Journal
LA Italian
AB Processes for the preparation of organic-inorganic composites (ceramers or **nanocomposites**) combining polymeric and silica phases are described, with particular reference to studies carried out by Loughborough University. An examination is also made of significant properties of these materials, including thermal expansion, elastic modulus, thermooxidative stability, porosity and **water** vapour permeability. 24 refs.
CC 51SS; 627; 932; 93511; 9511; 964; 9.12.2
SC *OK; MB; UE; UG; UH; UM
CT ACETYLENE GROUP; ACRYLATE POLYMER; ACRYLIC ESTER POLYMER; ADDITIVE; AGGREGATE; ALKOXYSILANE GROUP; AMIDE POLYMER; APPLICATION; CAPROLACTONE POLYMER; CARBONYL GROUP; CERAMER; CERAMIC; CERAMIC COMPOSITE; CHEMICAL STRUCTURE; COATING; COMPOSITE; CONDENSATION REACTION; CONTROLLED-RELEASE; COUPLING AGENT; CURING; CURING AGENT; DATA; DIMETHYL ACRYLAMIDE POLYMER; DIMETHYL SILOXANE POLYMER; ELASTIC MODULUS; **ELASTOMER**; ENGINEERING APPLICATION; ENGINEERING PLASTIC; EPOXIDE GROUP; EPOXIDE RESIN; EPOXY RESIN; ETHERKETONE POLYMER; EVAPORATION; EXFOLIATION; EXPANSION; FUNCTIONAL GROUP; FUNCTIONALISATION; FUNCTIONALIZATION; GEL; GELATION; GELLING; GELS; GLASS TRANSITION TEMPERATURE; GRAPH; HIGH MODULUS; HYBRID COMPOSITE; HYDROXYPROPYL CELLULOSE; IMIDE POLYMER; INSTITUTION; INTERLAMINAR PROPERTIES; INTERLAMINAR SHEAR; INTERLAMINAR SHEAR STRENGTH; MECHANICAL PROPERTIES; MERCAPTAN GROUP; MOLEC.WT.; MOLECULAR AGGREGATION; MOLECULAR MASS; MOLECULAR STRUCTURE; MOLECULAR WEIGHT; MORPHOLOGICAL PROPERTIES; MORPHOLOGY; **NANOCOMPOSITE**; **NANOSTRUCTURE**; NYLON; NYLON-6; OLIGOMER; ORGANIC-INORGANIC COMPOSITE; **PARTICLE GROWTH**; PDMS; PEK; PERFLUOROPOLYETHER; PHOSPHAZENE POLYMER; PLASTIC; POLYACRYLATE; POLYAMIDE; POLYAMIDE-6; POLYCAPROLACTONE; POLYDIALKYLSILOXANE; POLYDIMETHYL ACRYLAMIDE; POLYDIMETHYL SILOXANE; POLYDIMETHYLSILOXANE; POLYEPOXIDE; POLYETHER KETONE; POLYETHYL OXAZOLINE; POLYIMIDE; POLYPHENYLENE TEREPHTHALAMIDE; POLYPHOSPHAZENE; POLYSILOXANE; POLYSULFONE; POLYSULPHONE; POLYTETRAHYDROFURAN; POLYTETRAMETHYLENE ETHER; POLYTETRAMETHYLENE OXIDE; POLYVINYL ACETATE; POLYVINYL PYRROLIDONE; POLYVINYLPYRROLIDONE; POROSITY; PRECURSOR; PROPERTIES; PVAC; **RUBBER**; SILANOL GROUP; SILICONE POLYMER; SILOXANE POLYMER; SOL; SOL-GEL REACTION; SOLUBILITY; SOLUTION; SOLVENT EVAPORATION; SULPHONE POLYMER; TECHNICAL; TELECHELIC; TERMINATION; TG; THERMAL EXPANSION; THERMAL PROPERTIES; THERMOOXIDATIVE STABILITY; THERMOPLASTIC; THERMOSET; ULTRAVIOLET CURING; UV CURING; VAPOUR PERMEABILITY; **WATER ABSORPTION**; **WATER VAPOR PERMEABILITY**; **WATER VAPOUR PERMEABILITY**; XEROGEL; YOUNG'S MODULUS
NPT ISOIMIDE; METAL ALKOXIDE; **METAL CATION**; **MONTMORILLONITE**; ORMOSIL; SILANE; SILICA; SILICON DIOXIDE; TETRAETHOXYSILANE; TITANIUM; TITANIUM ISOPROPOXIDE; TITANIUM OXIDE; TRIALKOXYSILANE; TRIMETHOXYSILANE
SHR COMPOSITES, plastics, **rubbers**, fillers in, elastic properties, degradation, permeability, porosity, thermal properties; DEGRADATION, thermooxidative, plastics, **rubbers**, composites; POROSITY, plastics, **rubbers**, composites; FILLERS IN, plastics, **rubbers**, composites; PERMEABILITY, **water** vapour, plastics, **rubbers**, composites; ELASTIC PROPERTIES, plastics, **rubbers**, composites; THERMAL PROPERTIES, expansion, plastics, **rubbers**, composites; FILLERS OF, silica
GT EUROPEAN COMMUNITY; EUROPEAN UNION; UK; WESTERN EUROPE

L75 ANSWER 53 OF 59 JAPIO (C) 2004 JPO on STN

AN 1996-302025 JAPIO
TI PRODUCTION OF **ELASTOMER** CONTAINING INORGANIC FILLER AND COMPOSITE RESIN MATERIAL
IN NAKAZAWA HIROMOTO; FUJITA TAKETOSHI; HOSOKAWA TERUO; TAMURA TAKASHI; INOUE HIROFUMI; MOGI YOSHIHIRO
PA NATL INST FOR RES IN INORG MATER
SHOWA DENKO KK
PI JP 08302025 A 19961119 Heisei
AI JP 1995-108668 (JP07108668 Heisei) 19950502
PRAI JP 1995-108668 19950502
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996
IC ICM **C08J003-20**
ICS **C08J005-00**
ICI **C08L021:00**
AB PURPOSE: To simply produce a high-rigidity **elastomer** containing an inorganic filler having high general-purpose properties due to its excellence in heat and impact resistances at a low cost by finely dispersing an inorganic filler at the level of the **nanometer** order in an **elastomer** according to a specific method.
CONSTITUTION: (B) An organic **cation** (preferably a **quaternary** ammonium salt, etc., such as an n-alkyl ammonium salt) is initialy brought into contact with (A) a layer compound (e.g. **montmorillonite** or tetrasilicic mica) and the resultant mixture is then swelled with (C) an organic solvent (preferably an aliphatic alcohol, etc., having a structure of an electron donor such as methanol). The swollen material is subsequently kneaded with (D) an **elastomer** (e.g. an ethylene-propylene copolymer) by using, e.g. a twin-screw extruder. The components (B) and (C) are preferably added in respective amounts of 1-10 equivalent based on the **cation** exchange capacity of the component (A). Furthermore, the component (C) is preferably vaporized to carry out the mixing during a period without destroying and separating an infinite swollen structure and the dispersion is preferably performed by shearing.

L75 ANSWER 54 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:817955 HCAPLUS
DN 123:259471
ED Entered STN: 27 Sep 1995
TI Synthesis and properties of new poly(dimethylsiloxane) **nanocomposites**
AU Burnside, Shelly D.; Giannelis, Emmanuel P.
CS Dep. of Materials Science and Engineering, Cornell Univ., Ithaca, NY, 14853, USA
SO Chemistry of Materials (1995), 7(9), 1597-600
CODEN: CMATEX; ISSN: 0897-4756
PB American Chemical Society
DT Journal
LA English
CC 39-9 (Synthetic Elastomers and Natural **Rubber**)
AB Poly(dimethylsiloxane) **rubber**-silicate **nanocomposites** were prepared by melt processing. The preparation involved silicate delamination in the polymer matrix followed by crosslinking. Delamination was accomplished by fine-tuning organosilicate-polymer interactions. In addition, delamination was optimized by **water** addns. corresponding to about a monolayer coverage on the surface. The **nanocomposites** exhibit decreased solvent uptake and increased thermal stability. The

increased swelling resistance is attributed to strong reinforcement/matrix interactions and the large surface area attainable by delamination and dispersion of the silicate **particles** in the matrix.

ST silicone **rubber** silicate **nanocomposite** prepn; polydimethylsiloxane silicate **nanocomposite** prepn property; delamination silicate silicone **rubber** matrix; reinforced silicone **rubber** delaminated silicate; swelling resistance reinforced polydimethylsiloxane **rubber**

IT **Rubber**, silicone, properties
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)
(di-Me, preparation and properties of silicone **rubber** reinforced with in situ-delaminated ion-exchanged **montmorillonite**)

IT **Quaternary** ammonium compounds, properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(dimethylditallow alkyl, bromides, ion exchanged with **montmorillonite**; preparation and properties of silicone **rubber** reinforced with in situ-delaminated ion-exchanged **montmorillonite**)

IT **1318-93-0D, Montmorillonite,** ion exchanged with dimethylditallowammonium bromide, properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(delaminated; preparation and properties of silicone **rubber** reinforced with in situ-delaminated ion-exchanged **montmorillonite**)

IT 169314-28-7, SO 4682
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(preparation and properties of silicone **rubber** reinforced with in situ-delaminated ion-exchanged **montmorillonite**)

IT 9016-00-6, Dimethylsilanediol homopolymer, sru 31900-57-9, Dimethylsilanediol homopolymer
RL: PEP (Physical, engineering or chemical process); **POF (Polymer in formulation)**; PRP (Properties); PROC (Process); USES (Uses)
(**rubber**; preparation and properties of silicone **rubber** reinforced with in situ-delaminated ion-exchanged **montmorillonite**)

L75 ANSWER 55 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 9
AN 1995:337784 HCAPLUS
DN 122:135770
ED Entered STN: 07 Feb 1995
TI Organophilic **rubber-montmorillonite nanocomposites**
AU Akelah, A.; Salah El-Deen, N.; Hiltner, A.; Baer, E.; Moet, A.
CS Chemistry Department, Tanta University, Tanta, Egypt
SO Materials Letters (1995), 22(1,2), 97-102
CODEN: MLETDJ; ISSN: 0167-577X
PB Elsevier
DT Journal
LA English
CC 39-12 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 38
AB Organophilic **rubber-montmorillonite** (MMT) intercalates were prepared by a **cation**-exchange process by the interaction between the Na+ ions of **montmorillonite** and ammonium

cations of amine-terminated butadiene-acrylonitrile copolymers (nitrile **rubber**). The amount of the grafted **rubber** into **montmorillonite** layers as determined by the TGA anal. was found to be 0.6 g **rubber**/1 g **rubber**-MMT. The resulting **rubber**-MMT materials were identified by XRD, IR spectra and elemental anal. The SEM and TEM examns. showed that the **clay** layers were organized as **nanosized** clusters whose average size was 60 nm and basal spacings of 15.2 Å.

ST amine terminated nitrile **rubber montmorillonite nanocomposite**

IT Polymer morphology
(of amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

IT **Rubber**, nitrile, properties
RL: PRP (Properties)
(amine-terminated, characterization of amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

IT 9003-18-3
RL: PRP (Properties)
(**rubber**, amine-terminated, characterization of amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

IT **1318-93-0, Montmorillonite,** properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(sodium-exchanged; characterization of amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

L75 ANSWER 56 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:249609 HCAPLUS
DN 122:108386
ED Entered STN: 17 Dec 1994
TI Morphological hierarchy of butadiene-acrylonitrile/**montmorillonite nanocomposite**
AU Akelah, A.; Salahuddin, N.; Hiltner, A.; Baer, E.; Moet, A.
CS Department Macromolecular Science, Case Western Reserve University, Cleveland, OH, 44106-7202, USA
SO Nanostructured Materials (1994), 4(8), 965-78
CODEN: NMAEE7; ISSN: 0965-9773
PB Elsevier
DT Journal
LA English
CC 39-12 (Synthetic Elastomers and Natural **Rubber**)
Section cross-reference(s): 38

AB A hierarchical model of the morphol. of amine-terminated butadiene-acrylonitrile **rubber** (ATBN)-**montmorillonite** (MMT) **nanocomposite** was established. The composite was prepared by ion exchange between the onium salt of the polymer (ATBN) and the interlamellar **cation** of the mineral (MMT). Composite containing 40% mineral was obtained. Chemical anal. indicated that all the ionic sites of the mineral have been occupied by polymer end groups. The d(001) spacing and the span between the internal lamellar surface were only expanded to about 14 Å and 5 Å, resp., suggesting horizontal packing of the polymer mols. TEM examination of microtome sections, prepared from compression molded samples, revealed that the lamellae, laminated with polymers assembled into multiplets of about 5 nm. On the other hand, the multiplets appear to assembly into mineral rich domains whose average size was 250 nm.

ST nitrile **rubber montmorillonite nanocomposite**

morphol
IT Polymer morphology
(hierarchical model of morphol. of amine-terminated nitrile **rubber-montmorillonite nanocomposite**)
IT **Rubber**, nitrile, properties
RL: PRP (Properties)
(amine-terminated, hierarchical model of morphol. of amine-terminated nitrile **rubber-montmorillonite nanocomposite**)
IT **1318-93-0**, Sodium **montmorillonite**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(hierarchical model of morphol. of amine-terminated nitrile **rubber-montmorillonite nanocomposite**)
IT 9003-18-3
RL: PRP (Properties)
(**rubber**, amine-terminated, hierarchical model of morphol. of amine-terminated nitrile **rubber-montmorillonite nanocomposite**)

L75 ANSWER 57 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:695758 HCAPLUS
DN 123:289211
ED Entered STN: 22 Jul 1995
TI Preparation and characterization of butadiene-acrylonitrile/ **montmorillonite nanocomposite**
AU Akelah, A.; Salahuddin, N.; Hiltner, A.; Baer, E.; Moet, A.
CS Dep. Macromolecular Sci., Case Western Reserve Univ., Cleveland, OH, 44106-7202, USA
SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1994), 35(2), 739-40
CODEN: ACPPAY; ISSN: 0032-3934
PB American Chemical Society, Division of Polymer Chemistry
DT Journal
LA English
CC 39-12 (Synthetic Elastomers and Natural **Rubber**)
AB A model presenting the evolution of the hierarchical morphol. in Hycar ATBN (amine-terminated nitrile **rubber**) and **montmorillonite nanocomposites** is presented. In the intercalating medium, the mineral must have been disaggregated and swelled during the ion exchange reaction. Short range interactions must have been maintained on the lamellar scale as evidenced by their presence as multiplets and their reassembly into clusters. The inability of the mineral to reaggregate is attributed to the influence of ATBN through its dual functions, macromol. and **cationic**.
ST nitrile **rubber montmorillonite nanocomposite** morphol; model evolution hierarchical morphol **nanocomposite**
IT Polymer morphology
(model describing evolution of hierarchical morphol. in amine-terminated nitrile **rubber-montmorillonite nanocomposites**)
IT **Rubber**, nitrile, properties
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(amine-terminated, model describing evolution of hierarchical morphol. in amine-terminated nitrile **rubber-montmorillonite nanocomposites**)
IT **1318-93-0, Montmorillonite**, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(model describing evolution of hierarchical morphol. in

amine-terminated nitrile **rubber-montmorillonite nanocomposites**)
IT 9003-18-3
RL: **POF (Polymer in formulation)**; PRP (Properties); USES (Uses)
(**rubber**, amine-terminated, model describing evolution of hierarchical morphol. in amine-terminated nitrile **rubber-montmorillonite nanocomposites**)

L75 ANSWER 58 OF 59 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:92545 HCAPLUS
DN 122:216310
ED Entered STN: 08 Nov 1994
TI Layered silicate/ATBN **nanocomposite**
AU Moet, A.; Akelah, A.; Salahuddin, N.; Hiltner, A.; Baer, E.
CS Department of Macromolecular Science, Case Western Reserve University, Cleveland, OH, 44106-7202, USA
SO Materials Research Society Symposium Proceedings (1994), 351(Molecularly Designed Ultrafine/Nanostructured Materials), 163-70
CODEN: MRSPDH; ISSN: 0272-9172
DT Journal
LA English
CC 39-15 (Synthetic Elastomers and Natural **Rubber**)
AB Composites of Hycar ATBN amine-terminated acrylonitrile-butadiene **rubber** and **montmorillonite** (MMT) were prepared by ion exchange between the onium salt of the polymer and the interlamellar **cation** of the mineral following two different preparation approaches. The first carried out the ion exchange in situ and used dioxane, a better solvent for the polymer, and the second administered the onium salt to MMT using DMSO. Elemental anal. and IR spectroscopy indicated that all the ionic sites of the mineral have been occupied by polymer end groups. The d (001) spacing and the span between the internal lamellar surface were only expanded to about 14 Å and 5 Å, resp., suggesting horizontal packing of the polymer mols. TEM of microtome sections prepared from compression molded composites revealed that the lamellae, laminated with polymers, assembled into multiplets of about 5 nm for both prepns. The multiplets clustered into mineral-rich domains whose average size was 250 nm for the DMSO preparation Finer clusters (70 nm) were obtained by the first method. This three-fold decrease in the average domain size was attributed to the strong solvation power of dioxane in the binary solvent and to the locale of ion exchange.
ST **montmorillonite** nitrile **rubber nanocomposite**
IT Ion exchange
(amine-terminated acrylonitrile-butadiene **rubber**-sodium **montmorillonite nanocomposite** preparation by; morphol. hierarchy in relation to)
IT Polymer morphology
(of acrylonitrile-butadiene **rubber nanocomposites** with sodium **montmorillonite**; ion exchange preparation method in relation to)
IT **Rubber**, nitrile, preparation
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(amine-terminated, Hycar ATBN, **nanocomposites** with sodium **montmorillonite**; effect of ion exchange method on **nanostructure** evolution in preparation of)
IT **1318-93-0P**, Sodium **montmorillonite**, preparation
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(**nanocomposites** with amine-terminated acrylonitrile-butadiene **rubber**; effect of ion exchange method on **nanostructure**

evolution in preparation of)
IT 9003-18-3P
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(**rubber**, amine-terminated, Hycar ATBN, **nanocomposites** with sodium **montmorillonite**; effect of ion exchange method on **nanostructure** evolution in preparation of)

L75 ANSWER 59 OF 59 JAPIO (C) 2004 JPO on STN
AN 2003-192833 JAPIO
TI PREPARATION AND USE OF **NANOCOMPOSITE** MATERIAL OF **ELASTOMER** AND EXFOLIATED **CLAY** PLATELET FORMED IN SITU WITHIN **ELASTOMER** MATRIX AND PRODUCT INCLUDING TIRE HAVING AT LEAST ONE COMPONENT COMPRISING THE SAME
IN PARKER DANE KENTON; LARSON BRENT KEVIN; YANG XIAOPING
PA GOODYEAR TIRE & RUBBER CO:THE
PI JP 2003192833 A 20030709 Heisei
AI JP 2002-372736 (JP2002372736 Heisei) 20021224
PRAI US 2001-37539 20011221
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2003
IC ICM **C08L009-00**
ICS B60C001-00; **C08K003-34**
AB PROBLEM TO BE SOLVED: To provide preparation and use of **nanocomposite** materials comprising an **elastomer** matrix containing a dispersion therein of at least partially exfoliated platelets of an intercalated, multilayered, water-swellable **clay**.
SOLUTION: The exfoliated platelets are induced from an intercalated **clay** formed by an in situ **cation** exchange phenomenon between **cationically** exchangeable ions within galleries between layers of a multilayered **clay** and a preformed **latex** of **cationic** (positively charged) **elastomer** particles. Furthermore, the positively charged **latex elastomer** particles can be produced by free radical emulsion polymerization using (A) a nonpoymerizable **cationic** surfactant and/or (B) a polymerizable **cationic** surfactant.

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